

Railway Age

Vol. 79, No. 9

August 29, 1925

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Another Accident at a Protected Crossing

ANOTHER highway grade crossing accident at a crossing supposedly protected by gates has been reported, caused by the failure of the attendant watchman to manipulate the gates properly. Users of the highways, almost without exception, seem to have the impression that the existence of crossing gates makes all precautions on their part unnecessary. Drivers who will obey regularly the caution of "stop, look and listen" at unprotected crossings will frequently not even slacken speed at crossings equipped with gates if the gates are up. Should they not be educated as to the actual facts of the case?—that if the gates are lowered, they *must* stop, but that, even if the gates are up, there is still need of caution. For unless the gates are interlocked in some way with the railroad signals, no assurance can be given the motorist that in all cases the failure to lower gates means that the way is clear for him.

Locomotive Progress in Twenty Years

IT is well to take account of stock occasionally, note the progress in the past twenty years, for example, and get a new vision of the possibilities for future development. As relates to past improvement in locomotive design and performance, the railroad industry and those associated with it need have no hesitation in opening the record book for examination. In 1904, a heavy, and at that time modern, consolidation type freight locomotive was tested at the Louisiana Purchase Exposition at St. Louis, and a comparison of the general results with those obtained in the recent tests of a Missouri Pacific three-cylinder Mikado locomotive at the Altoona test plant are highly illuminating. The comparative figures are best shown in tabular form.

INCREASE IN LOCOMOTIVE EFFICIENCY IN TWENTY YEARS

	Heavy Consolidation Freight Locomotive (1905)	Missouri Pacific 3-cylinder Locomotive (1925)
Weight on drivers	173,000	244,500
Cylinder size	22 in. by 28 in.	23 in. by 32 in. outside
Maximum drawbar pull developed	22,078	61,847
Pounds of dry coal fired per 1 hp. hr.	2.9 to 5.4	2.1 to 3.8
Boiler efficiency, per cent.	45.4 to 78.9	49 to 83
Machine efficiency, per cent.	72.9 to 84.8	83 to 92
Overall efficiency of the locomotive, per cent.	2.4 to 5.1	4.3 to 7.3

An examination of these figures indicates that with an increase in weight on drivers of 41 per cent the drawbar pull increased 180 per cent. The effect of improved locomotive design on the coal pile is shown by the fact that for every horsepower hour developed in the new locomotive almost one-third less fuel is required. The real significance of what locomotive designers have accomplished, however, is shown in a comparison of the figures for boiler, machine, and overall efficiency. These figures speak for themselves. A roundhouse foreman recently said: "If the modern engine were as wasteful

of coal as its predecessor of twenty years ago we would have to hook a coal car on behind the tender to carry the extra fuel." This statement is an exaggeration which, however, shows the real opinion of a railroad mechanical officer whose natural inclination is to criticize the modern design with its many fuel-saving accessories, all of which add to the sum total of locomotive maintenance. The improved performance secured with the modern locomotive makes it desirable to retire, or rebuild and thoroughly improve, many of earlier and relatively inferior design.

Is There Room for Initiative and Progress on the Railroads?

ONE still hears occasionally criticism of the railways for alleged lack of initiative and progress in spite of the remarkable increases in efficiency of operation that have occurred within recent years. Roughly, such criticism may be classified into two categories—that from the business world, which accounts for the phenomenon which it claims to detect by the increase of government regulation; the other is that from the enemies of private ownership who would find fault no matter how well things were going. It is only the criticism of the former, which may be called in general friendly, that needs to concern railroad men very much. Apparently it does concern them considerably, and the charge has been repeated so often that some railroad men seem to be coming to believe that it is true. Not long ago a railroad officer made the remark—in private naturally—that he had sufficient influence to stop any change of policy or methods on the property with which he was connected, but that he had *not* sufficient influence to put through a change in policy or method. In other words, he had the veto power but no power of initiative. It is easy to see that such limitations on many railroad officers would practically block any chance of progress. That there is progress belies the assumption that such a condition is general—yet that it should exist at all is a matter for serious concern. Discussion of policies by outsiders, however, in whatever field, tends to lag behind the actual accomplishments in the field itself. The general public frequently does not wake up to the seriousness of a problem until those closer to it have brought it near solution. Then they continue the outcry about it when the cause of their ululations has all but disappeared. It is undoubtedly true that the period of federal control left the railroads somewhat stunned and that they had barely begun to get on their feet when the shop strike gave them another staggering blow. Yet, now is there any reason to be too worried by the lack of railroad initiative? Probably there is not progress enough—we are not advocating complacency—but what important branch of railroading is there which has not been measurably improved in the last three years? Progress in improving human relations in the industry, mechanical improvements, higher operating efficiency, better service to shippers and

passengers, the revival of railroad consolidation activity—certainly all these things could not take place in an industry where initiative and progress had no fair opportunity.

"Wall Street" and the Railroads

THE Bache Review, which is issued by J. S. Bache & Co., a New York banking house, has been publishing a series of interesting and constructive articles under the general title "The Rights of the American Railway Investor." In these articles abundant facts and figures have been given to show that for a long period of years the investor in railway securities has been prevented from receiving returns such as he had a right to expect and such as have been derived from investment not only in industrial but also in public utility securities.

This result has been attributed in the articles to various causes. These include undue expense incurred by the railways in rendering competitive passenger and freight service, and failure of railway executives to fight as hard and courageously as they should have for a policy of regulation which would give actual effect to the constitutional principle often reiterated by the courts and expressly set forth in the Transportation Act that railways are entitled to a fair return upon the fair value of their properties.

We think the articles mentioned have somewhat exaggerated the extent to which operating expenses have been affected by undue competition. At any rate, it always has been and still is contemplated by the laws regulating railways that they shall compete in rendering service, and as long as that is true the harm as well as the good to which competition inevitably leads will be done. We believe the good now done by railway competition greatly exceeds the harm. There may be ground for the criticism that railway officers have not fought as hard and courageously as they should have for recognition, in the administration of regulatory laws, of the moral and legal rights of investors in railway securities. There is also ground for criticism that there has not been as much unity of utterance and action by railway officers as there should have been in favor of sound policies as respects those matters in which all railways have a common concern.

There is, however, one reason more important than all others why the railways have been unable to get fair regulation, and mention and emphasis of which is made pertinent by the publication of these articles by an eastern banking house. This is the influence exerted upon public sentiment by the real or supposed relations between the railroads and eastern banking houses. In alluding to this matter we do not refer, of course, to any particular banking house, but to all those that are popularly designated as "Wall Street."

Many believe that most of the securities of the railroads are owned in "Wall Street," and most persons who do not believe this do believe that "Wall Street" "controls" the railroads. Furthermore, a very large majority of the people feel quite sure that "Wall Street" uses its power entirely for its own selfish interest, and in disregard of the rights and welfare not only of the public but of railway security owners who are not a part of "Wall Street." Now, indirectly, but none the less certainly, public sentiment has in the past, does now and will in future determine the regulation of the railways, and for many years the public's belief as to the relations between "Wall Street" and the railroads has been the principal cause of the existence and persistence of a public sentiment which has caused the railways to be regulated as they have been. Everybody who has actively participated in the discussion

of the railroad question, and who has read the newspapers and mingled with all classes of people, especially in the south and west, knows that suspicion and fear of "Wall Street" have been a greater obstacle than all other obstacles combined to the creation of a public sentiment that would even tolerate, much less favor, a fair and constructive policy of regulation.

It is a remarkable fact that the great bankers of the east seem only vaguely and occasionally to recognize the existence of this situation and do little or nothing to change it, or to co-operate with those who are trying to change it. They seem to have, to a very unusual degree, the fatal inability of most men to see themselves as others see them.

What are some of the things that bankers are believed to do that keep alive public antagonism to the railways? It is widely believed that they use their alleged control of railways for the purpose of exacting excessive fees and commissions for underwriting railway securities and for refinancing and reorganizing railways. Recently widespread publicity has been given to the dissenting opinions of certain members of the Interstate Commerce Commission in a proceeding involving allowances made to reorganization committees and counsel in connection with the reorganization of the M. K. T. Lines, and these allowances have been the subject of adverse comment in newspapers and by people throughout the country. The effect produced upon public sentiment by the publicity given to this case is not unlikely to cost the railways in net operating income one hundred times as much as the fees received by the reorganization committees and their counsel. A majority of the members of the Interstate Commerce Commission held these fees reasonable. What has "Wall Street" done to explain and defend them to the public? Nothing, so far as we know.

Another thing that is believed of the great eastern banking houses is that they have in the past inflated the securities of railways, sold them to investors at large profits to themselves and made necessary high rates upon the railways to earn a return upon the so-called "watered" securities. Regardless of the grounds for this belief there is no other that is more firmly fixed in the public mind, or that does more to make it difficult to create a sentiment in favor of reasonable regulation. It is widely believed that while able and experienced men are placed in direct charge of the management of the railroads they are constantly interfered with by eastern financial interests, and not allowed to do what they are disposed to do for the benefit of the people that their lines serve. It has been repeatedly charged and is widely believed that large banking houses are influential in both railroads and industrial companies, and that they sometimes use their influence on the railroads to determine from what companies purchases shall be made and what prices shall be paid.

It is well known that much more progress has been made within the last ten years in securing fair regulation for public utilities than for railroads. This has sometimes been attributed to the exercise of greater diplomacy, energy and ability by public utility managers than by railway managers. We believe this view is entirely baseless, and that the real reason for the difference has been that the public utilities have been to a greater extent financed by banking houses in their own communities, that there has been a greater increase in local ownership of the securities of public utilities and that in consequence, unlike the railways, they have not been obliged constantly to confront a public sentiment dominated by suspicion and fear of so-called "Wall Street control."

It is not only to the interest of railway security owners and the public, but of the great banking houses of the east, that the railways of the country should prosper.

These banking houses have large interests in industrial and public utility companies as well as in railroads. Unless the railroads prosper they cannot, regardless of their banking connections, raise the new capital required to enable them to render adequate service and operate with maximum economy; and unless they can render adequate service and operate with maximum economy the prosperity of every other large concern in which the banking houses are interested will be jeopardized. It is therefore to the interest of "Wall Street" to make greater efforts to follow a policy which will gradually destroy the widely prevalent beliefs mentioned regarding the relations between "Wall Street" and the railroads. There should be more participation in the financing of western and southern railroads by western and southern banking houses. There should be more western and southern men in the directorates of railroads in these territories. There should be greater efforts made to get the stock of railways bought by people living in the territories they serve. There should be the least possible interference by eastern banking interests with the way railway officers perform their managerial duties. Finally, "Wall Street" should learn to explain and defend itself to the people of the country, and as one prerequisite to this it should learn what the people actually think of "Wall Street" and the real reasons why they think it. The average eastern banker acts as if he knows and cares as little about southern and western public sentiment and the reasons for it as about public sentiment on Mars.

The Increasing Burden of Fixed Charges

REFERENCE often has been made in these columns to the fact that for some years additions and improvements have been financed by the railways almost entirely with borrowed money, and that, in consequence, their fixed charges have been increasing faster in proportion than the income, from which returns upon investment must be paid. The railways have two kinds of income for paying fixed charges and dividends and making capital expenditures. One is net operating income, and the other is income derived from various kinds of investments extraneous to their operating properties.

The net operating income of the Class I roads in 1916 was \$1,040,084,517, and their "other income" was \$210,066,879, making what is called a "total income" of \$1,250,151,396. Their net operating income in 1924 was \$973,870,978, and their other income \$272,989,155, making a "total income" of \$1,246,860,133. Their total fixed charges in 1916 were \$603,270,723 and in 1924 \$684,557,457. It will be seen therefore that while their total income was about \$3,300,000 less in 1924 than in 1916, their fixed charges were about \$81,300,000 more, the net result being, in spite of large increase of investment in property, a reduction of about \$85,000,000 in the income available for dividends and investment in additions and improvements. In 1916 fixed charges consumed only about 48 per cent of "total income" and in 1924 about 55 per cent.

The statistics of the western roads make a much more unsatisfactory showing than those for the Class I railways as a whole. In 1916 their net operating income was \$456,049,664 and their other income \$94,766,304, a total of \$550,815,968. In 1924 their net operating income was \$371,392,543 and their other income \$120,966,099, a total of \$492,358,642. Their fixed charges in 1916 were \$272,959,093 and in 1924 they were \$281,952,172. The net result of the reduction in their total income and increase

in fixed charges was a reduction of almost \$67,500,000 in that part of their income available for dividends and for investment in additions and improvements. In 1916 their fixed charges were less than 50 per cent of their total income, and in 1924 they were almost 57½ per cent of it.

The use of these statistics may be criticised on the ground that it involves comparison of the results of 1924 with those of 1916 in the latter of which years the net operating income earned by the railways as a whole was the largest in history. But the net return earned by the Class I roads as a whole in 1916 can hardly be said to have been excessive, and surely it is a significant fact that after the passage of eight years, and after all the increase in traffic and in investment in railways that had meantime occurred the net return of 1916 was still the largest in history. Furthermore, it was not in 1916, but in 1917, that the western lines made the best showing. In that year their "total income" was \$552,339,047 and their fixed charges \$255,800,667. Therefore, their total income for 1924 was almost \$60,000,000 less than in 1917 and their fixed charges about \$26,000,000 greater, making the net income of 1924 available for dividends and investment in additions and improvements \$86,000,000 less than that of 1917.

This tendency of fixed charges to increase more in proportion than the total income available for fixed charges and other purposes has prevailed for a long period of years. The first case heard by the Interstate Commerce Commission involving a general reduction or advance of rates was the great rate advance case which it decided in 1911. In that year fixed charges took 51 per cent of the total income available for fixed charges, dividends, etc. The net income left after fixed charges were paid was only about 4 per cent less than the total fixed charges. The year 1911 was relatively worse from the standpoint of net return than any of the six consecutive years that immediately preceded it, but even in 1911 the fixed charges of all Class I railways were less in proportion to total income than they have been in any year since except 1916 and 1917. In 1921 fixed charges were 68 per cent of total income and in 1922, 64 per cent. In 1923 and 1924, in spite of the increase in net operating income that occurred, fixed charges still averaged about 55 per cent of total income; and in 1924 they exceeded by 24 per cent the amount of net income available for dividends, additions and improvements.

As to the railways of the western district, in 1911, their fixed charges were only about 46 per cent of their total income and were therefore somewhat less than the net income available for dividends, etc. They have never made an equally good showing since. In 1923 their fixed charges were almost 59 per cent and in 1924 over 57 per cent of their total income. In 1911 their fixed charges were 16 per cent less than their net income available for dividends, etc., whereas in 1921 their fixed charges exceeded their net income by 61½ per cent; in 1922 by almost 68 per cent; in 1923 by almost 43 per cent, and in 1924 by 34 per cent.

Actual figures may illustrate the change that has occurred in the financial situation of the western roads even more strikingly than percentages. From 1911 to 1924 the fixed charges of these roads increased from \$232,000,000 to \$282,000,000, or \$50,000,000. There was almost no increase meantime in their total income, and the result was that in 1924 they had \$55,500,000 less net available for dividends than they had in 1911, thirteen years before.

Any industry the indebtedness and fixed charges of which are steadily increasing faster in proportion than the income from which these charges must be paid is marching steadily toward bankruptcy. The evil day may

be postponed from time to time or it may be a long way off but it will be reached sooner or later unless the trend in the wrong direction is checked. Periods of business depression always have, and no doubt always will, alternate with periods of prosperity. It is a notable and ominous fact that in each of the two periods of depression through which the railways have passed within the last 15 years the ratio of their fixed charges to their total income has made a new high record. They passed through a brief but not severe period of depression in 1914 and 1915. In the former year their fixed charges rose to 61.2 per cent, and in the latter year to 63.6 per cent, of their total income. In 1914 their fixed charges were 58 per cent greater and in 1915, 75 per cent greater than the net income available for dividends, and in 1915 there were more miles of railroad in the hands of receivers than ever before.

The second period of depression mentioned was that which began late in 1920. In 1921 the fixed charges of the railways as a whole rose to almost 68 per cent of their total income and in 1922 were still 64 per cent of it. In 1921 their fixed charges exceeded by 111 per cent their net income for dividends, etc., and in 1922 still exceeded it by 77 per cent.

The years 1923 and 1924 were years of moderate prosperity in most parts of the country. Even in those years, however, as already shown, 55 per cent of the total income of the railways was consumed by fixed charges, and in the western district in the two years an average of about 58 per cent. Since these were years of moderate prosperity the figures given are ominous. If they are allowed to stay so high in years of prosperity, how high will they go in the next period of depression? It will not be possible, when the next period of depression comes, to effect such enormous economies as were made in 1921. The size of the economies then made was mainly due to a reduction of 362,000 in the number of employees, and this reduction was possible only because of the large increase in employees that had occurred as a result of the war and government control. If fixed charges should continue to average 55 per cent of total income during years of prosperity they probably would rise to an average of 75 per cent in the next period of depression; and when the fixed charges of all railways average that high the whole country will be strewn with bankrupt railway systems.

Altogether aside from the menace to the solvency of the country's railways and to its entire financial structure that is presented by the advancing ratio of fixed charges to total income, this tendency is economically unsound because it tends to make railway stocks more and more speculative and less and less attractive as investments. When a railway's fixed charges are high in proportion to its total income a substantial increase in its total income disproportionately increases the percentage of net income upon its stock, while a substantial reduction of its total income disproportionately reduces the percentage of net income upon its stock. The result is to cause extreme advances and declines in the market price of its stock, which may make it an attractive plaything for speculators, but which also make it a very bad thing for purchase by persons who desire to buy securities for permanent investment.

It should be among the most important objects of government regulation to establish relations between the fixed charges and the total income of the railways which will make them a tower of strength to the nation in periods of financial stress, and which will make their securities, including their stocks, good permanent investments. The way the rates and net return of the railways have been regulated for the last fifteen years and are still be-

ing regulated has tended and still tends to make them a menace to the country's welfare in periods of depression and to increase the speculative character of their securities.

Building Better Supervision

IT takes real persistence and hard work to keep a large group of officers and foremen on a single railroad, at a local point, intensely interested over a period of years in a program devised to assist them in understanding how better to meet their responsibilities and take advantage of their opportunities. This, however, is the record of the Pennsylvania Railroad Club of Harrisburg. It has held eight or more meetings a year, most of which included addresses of about one hour in duration, followed by group discussions of the principles enunciated as applied to the peculiar problems of the various departments and groups. In addition to this, the proceedings for each year, carefully edited and including the high points and conclusions in the group discussions, are published in a neat, attractive form under the title of "Foreman Training Course." The term "foreman," however, is interpreted in a broad sense, for the membership of the club is open to the employees of the Philadelphia division and the general offices at Harrisburg who are acting in supervisory capacities. The club, however, is an outgrowth of the Harrisburg Shop Foremen's Club and the membership is largely made up from the supervisory staff of the mechanical and stores departments. The object of the club is "to bring all of the departments into a closer understanding of the part they perform, and its result in the entire operation of the Pennsylvania Railroad System; also, to provide educational advantages for those in charge of the various departments, and thereby bring about a closer fraternal and social co-operation between departments."

The foreword to the 1924-25 proceedings reflects something of the ideals and spirit which dominate the work of the club. It is brief and under the title, "The Building of Industrial Morale," includes this statement: "Morale means satisfied employees. The first essential desires of industrial employees, in the order of their importance, are: (1) A steady job; (2) adequate wages; (3) a real foreman; (4) an individual and collective voice about working conditions; (5) opportunity to advance." The program for the year included three meetings addressed by Dr. A. F. Sheldon under the general title of "Forum of Fundamentals" and including "The Principle of Service," "The Psychology of Human Relationships" and "The Universal Efficiency Formula." In addition to this five other meetings were addressed by railroad officers and others on "Maintenance Versus Renewals," "The Foreman as a Business Getter," "Legislation Affecting Railroad Operation," "The Foreman and Safety First" and "A Challenge for Better Leadership."

The ability of a foreman or supervisory officer to deal with his men tactfully and develop real leadership ability is a most important factor in building up the morale of an organization, with all that that means in the way of increased efficiency and an attitude of loyal co-operation on the part of the workers in promoting the best interests of the company. The Harrisburg club illustrates one way in which the supervisory officers can fit themselves for larger responsibilities and become better and stronger leaders. It was the first of the so-called foremen's clubs to be formed on the Pennsylvania and was promoted and developed by the men themselves, because they sensed the need for it. Undoubtedly the fact that it was their own organization, developed by themselves, has been a large factor in its growing success over a period of a number of years.

Train Stop or Train Control

THE development of automatic train control apparatus and the progress which is being made in its installation on the railroads have taken many decided turns since the Interstate Commerce Commission issued its first order on June 13, 1922. Four of the 49 carriers listed in that order have since been excused, while as a final result of a second order issued on January 10, 1923, 41 of the remaining 45 are required to equip a second division. A dozen or more of the carriers now have a division operating under automatic protection and a number of other installations are practically completed with the exception of a few engine equipments. In consideration of the magnitude of the problems involved the Commission has granted the requests of the carriers for extensions of the time limit, in some cases until July 1, 1926.

One of the principal factors influencing the necessity for extensions of time was the action of the Commission in July, 1924, in inserting Clause 1b in the specifications for the train stop, reading as follows:

"(b) Under control of the engineman who may, if alert, forestall the application of the brakes by the automatic train stop device and control his train in the usual manner in accordance with hand signals or under limits fixed by train order or prescribed by the operating rules of the company."

Commissioner McManamy, in a concurring opinion accompanying this report of July 26, 1924, summarized the situation clearly in his statement that, "installations should be required in such a way as to suit the needs of the particular carrier—different treatment for different roads and parts of roads, depending upon the facts in each case. The installation of train control might be proper in one case and unreasonable in another because of the differences in the speed of trains, density of traffic, financial conditions, etc. The installation of automatic block signals on certain divisions of light or medium traffic density would be sufficient. The installation of automatic stops with the permissive feature at certain locations would undoubtedly meet the needs for many years. The installation of train control, developed to the point of reliability and practicability, should without doubt be required as an additional safeguard on the busiest passenger divisions."

The insertion of Clause 1b in the specifications for train stops was no doubt the result of a request made by certain operating officers in the train control hearings held previously before the Commission. As explained by these operating officers a train stop system without a permissive feature would result in numerous train stops and train delays. Such stops would be especially objectionable in tunnels, on long grades, or at braking distance from the head-in switch of a passing track on a single track line when a second train was holding the main line.

The term *train stop* applies to a simple system that stops a train automatically at a danger signal (or a caution signal under certain conditions), but does not limit the speed in an occupied or caution block; whereas the term *train control* applies to a system, either intermittent or continuous, that includes speed control in addition to the stop features. In the specifications accompanying the order as issued originally in June, 1922, the train stop was defined as, "a system without manual control by the engineman requiring the train to be stopped, after which the apparatus may be restored to normal condition manually and the train permitted to proceed."

It may, therefore, be seen that when Clause 1b was inserted under this specification the requirements with respect to many of the roads were entirely changed. Cer-

tain carriers which had planned the installation of complete *train control* systems with speed control at once changed over to the use of the simple *train stop*. The simplicity of the train stop equipment as compared with the more complicated train control apparatus, together with the reduced cost of its installation and maintenance, were the controlling factors contributing to these changes in the plans of the carriers to use train stop instead of train control.

Since the order of the Commission was issued in June, 1922, there has been an intensive development of train stop and train control apparatus. New systems have been developed and improvements have been made in existing systems. Development is, of course, not completed, but it is at a stage that warrants any railroad installing a division with any one of several systems.

At the time the original order was proposed in January, 1922, and at various times since, the *Railway Age* advocated the insertion of Clause 1b, it being our contention that during the development of automatic train control the simple train stop would afford adequate protection on roads with moderate traffic and that the best results would be secured during the development period by extended comparison between the train stop and the train control under different conditions. We considered the action of the Commission in granting the permissive feature in train control as a boon to many of the carriers with comparatively light traffic.

However, it would appear that installations are not being made entirely in accordance with varying conditions as it was anticipated that they would be. Reports show that of the 45 roads affected by the first order, 31 are now using, or planning to use, the automatic train stop, and 14 roads the automatic train control. If the principle stated by Commissioner McManamy may be used as a guide, it appears that a few of the carriers with comparatively light traffic are using the train control when the train stop would serve and that several of the carriers handling high speed, dense passenger traffic are planning to use the train stop, where train control might better be tried. On lines where high speed passenger trains are operated in sections on close headway there is the greatest liability of the train stop not affording adequate protection. If one or more serious accidents should occur in such territories, as a result of promiscuous use by enginemen of the permissive feature with the train stop, Commissioner McManamy's statement that "the installation of train control, developed to the point of reliability and practicability, should without doubt be required as an additional safeguard on the busiest passenger divisions," might be recalled in a way that would be embarrassing and troublesome to a number of roads.

New Books

The Station Agent's Blue Book. By O. B. Kirkpatrick. 523 pages. 8½ in. x 10¾ in. Bound in imitation leather. Published by Kirkpatrick Publishing Company, 10 East Huron Street, Chicago. Price \$10.

The title of this book will appeal to many readers as peculiarly appropriate because it is like the well-known Blue Book so widely used by automobilists. Thus, whereas the highway blue book assists one to select the right road and turn of a region's highways and byways, the Station Agent's Blue Book assists one to pursue the proper course through the intricacies of the station agent's work. It is a handsome book, printed and made in the best of taste. It is very full, thorough and complete on all the varied branches of its subject, and bears on every

page the marks of utmost care in the pursuit of accuracy.

The author has not mastered the art of cutting out redundant words (though he says that he has been a telegrapher) and in that respect could take lessons from the guide-book makers; but so many railroad writers—especially those who prepare the railroad companies' instructions—go to the other extreme, and condense their books by leaving out much useful matter, that a possible tendency towards verbosity is a fault that will readily be forgiven.

Mr. Kirkpatrick explains the purpose of his book to be as follows:

"While some of the carriers have issued very complete and well-indexed books of instructions to station agents, in which every phase of station work is covered, they are clearly comprehensible only to those who are proficient in station accounting methods, and who have had an opportunity to become well-versed in station operations. The reason for this is obvious when it is realized that in practically every instance the instructions are written by the heads of departments, who are so familiar with the subject covered, and who know so well the result desired by each department, that they inadvertently fail to embody detailed explanation sufficient to make the instructions easy to follow by the less experienced or the more recently employed station forces.

"In no book of instructions to station agents so far examined has even an attempt been made to explain the principle of debit and credit as applied to station accounting, or to teach the elementary principles of the subject. Therefore, it is the purpose of this book to assemble in reasonable order all the phases of station duties, and by the liberal use of illustrated forms, together with an analysis of their relation to station work, demonstrate the fundamental principles of station accounting in a manner that will convey a comprehensible solution of every problem that may be presented to the station forces."

The discussion of the work of the station agent is divided into 42 chapters or heads; and when it is seen that each one of these is treated as exhaustively as though the author had nothing else to write about, the reader will understand how it has been possible to expand the book to over 500 large pages. There are 195 diagrams and other illustrations. The paragraphs are numbered throughout the book in a single series, and there are 2,640 of them. It is out of the question for the reviewer to read critically a tenth of these; but basing his opinion on those which have been read he has no hesitation in classing the work as a model of precision and completeness, and it is adapted to its purpose with mature judgment. It shows such complete knowledge of the fundamental principles as well as the minutest features of everyday practice that the reader is assured, at every point, that the author's knowledge of the freight business includes every smallest detail, from A to Z.

The author's plan is ultra-practical. First, he describes the station; then the station agent and his helpers, and then there is a brief summary of the kind of business the agent has to do. Following some very complete chapters on bills of lading, the classification, freight claims, switching and the other well-known branches, he takes up station accounting, which fills a good deal more than half of the book. Here he presents a complete set of station records and station reports for a whole month, and every theoretical question presenting itself to the student or reader is explained. The author does not take an actual railroad; but takes St. Louis as a typical station, and, referring to a map of the United States on which there are 13 imaginary railroads, he takes one of these, the A. B. & C., and deals with the routing, the billing, the procedure at destination, and every transaction, as in actual life. For example, the daily report of way bills forwarded matches, in every item, with the daily balance sheet shown on another page, and with monthly summaries shown further on, etc.

At the end of each chapter is a group of test questions which the reader may use to check up on the care with

which he has followed through the author's presentation.

The author, of course, would have found it impossible to show all the forms in use at the station of any agent who may purchase the book. He has, however, made a careful selection of the best practices and forms and gives a generous reproduction of the standard forms and practices recommended by the Railway Accounting Officers' Association, which, of course, in a great many ways is the final arbiter in this department of railroading.

The author is entitled to a great deal of credit for undertaking and successfully completing such a monumental task as must have been involved in the preparation of a book like this. The railroad world needs more books made with the care, discretion and prodigious industry here exhibited.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Color-blindness, by Mary Colins. Includes comparison of different methods of testing color-blindness, and bibliography. 268 p. Pub. by Harcourt, Brace & Co., New York City. \$4.50.

Railroad Freight Rate Structures: Eastern Territory. 102 p. Pub. by LaSalle University Press. \$2.00.

Review of the Developments in Connection with Federal Valuation Between Jan. 15, 1925 and July 31, 1925, by F. H. Lee. 17 p. 3 tables. Pub. by Pres. Conf. Comm. on Fed. Valuation of Railroads, Philadelphia, Penna.

Periodical Articles

The Attack upon Section 15a of the Interstate Commerce Act, by D. Philip Locklin. Arguments for and against section considered, with conclusions therefrom. *Journal of Political Economy*, August, 1925, p. 434-454.

Fast Freight Transportation Rebuilding the Business World. Articles II and III. *Executive's Magazine*, July, 1925, p. 12, 22; August, 1925, p. 13, 22, 24.

Let's Check the Trunks, by John R. Tunis. How railroads handle trunks, dogs, and other things that travelers check. *Saturday Evening Post*, Aug. 22, 1925, p. 23, 94, 96, 100.

Outstanding Figures in Proposals for the Formation of New Railroad Systems. Presidents Bernet, Loree, Rea, and Willard. *World's Work*, Sept., 1925, p. 455.

The Railway Presidents of Canada, by John Nelson. "Thornton and Beatty typify two dissimilar ideals in transportation." *World's Work*, Sept., 1925, p. 501-507.

Rainfall and the Populist Party of Nebraska, by John D. Barnhart. Effect of long drought on crops, politics, and particularly on railroad rate attacks in Nebraska and adjacent states. *American Political Science Review*, Aug., 1925, p. 527-540.

Railway Architectural Progress, by J. E. Reid. Place of architect in railroad organization, effects of smoke abatement, etc. *Architect* (London, Eng.), July 3, 1925, p. 14.

Where the Embattled Commuter Stands. Summary of comments in daily papers of New York District and in the *Railway Age* on suburban service and rate situation, illustrated with cartoons. *Literary Digest*, Aug. 22, 1925, p. 5-6.

Letters to the Editor

Passenger Train Handling

NEW YORK, N. Y.

TO THE EDITOR:

Regarding your article in the June 6 issue of *Railway Age* on "Passenger Train—Handle with Care." This is a very important subject and one that requires more action than is being taken on most railroads to eliminate the cause rather than to blame it all on the engineman.

I would suggest that a good practical mechanical man, who can investigate the cause and place the blame where it belongs, ride the train instead of a locomotive engineer. In my years of experience I have found the following chief causes of what is called rough handling:

Too much slack between the engine and head car. In some cases there is no buffer compression on the engine tender. The buffer plates on the cars have from one to three inches slack when the train is standing still, which shows that the spring in the buffers are not adequate to keep them in compression. The draft rigging on the cars is not sufficient to take care of slack and in many cases the springs are so weak that they give the train a jerking motion which, when the air is applied, will cause the cars to bunch. This often gives the impression of rough handling. If the train—from the locomotive to the rear car—has good buffers and buffer springs and the draft rigging is suitable for the service, the buffers and draft rigging will all be in compression at one time.

I admit that there are many cases of rough handling, such as backing cars on the train with great force; but a great many of the complaints can be overcome if the points to which I have called attention are followed.

It might be advantageous if master mechanics and mechanical men would, for their own information, look over an ordinary passenger train and check up the amount of slack between the cars and engine. F. W. BRAZIER.

Asst. to Gen'l Supt. Rolling Stock, N. Y. Central.

Worn Out Traditions and Rule-of-Thumb Methods

ALBANY, N. Y.

TO THE EDITOR:

I have read with much interest the letter from James B. Latimer in the *Railway Age* for August 8, 1925. I am interested because I have been friend and teacher, at Lehigh University, of James H. Le Van who is the subject of this letter.

A letter may be somewhat misleading as to the real personality of the writer. Perhaps Mr. Le Van expressed his thoughts in an indefinite way in his letter published in the *Railway Age* of May 2. At any rate, I feel sure that Mr. Latimer has failed to appraise Mr. Le Van correctly. For that matter, I believe Mr. Latimer is pretty far off in regard to his estimate of the large majority of engineering graduates. However, Mr. Le Van is certainly not a "rah-rah" boy. He is not at all "stuck on himself." On the contrary he is most modest; moreover, he is a keen thinker and a practical-minded fellow who can do practical things.

Mr. Le Van is very much interested in railroading. But perhaps he feels in his heart that sometimes railroad executives fail to catch that spark of desire to work hard at a

pleasant task, which glows in these young men. A young graduate, like any other novice, gets ahead when there is a "meeting of the minds" between himself and his "boss." But the "boss" must do his share.

After following the letters in the *Railway Age* about college men on railroads, my own opinion is that many railroad executives, like executives in other industries, put themselves and their methods on the defensive unnecessarily before their young college trained employees. They seem to feel that they are dealing with an unknown quantity which may have potentialities for evil in their official lives. Their tendency then is to hold these young men off at arm's length.

Perhaps these executives, being human, fear hurt pride most of all. But if the accepting of new ideas and new methods, and new independence of thought from young college graduates means hurt pride, then the executive who acquires the hurt pride is most charitably defined as a narrow-minded man.

The fact remains that you can't teach a man for four (or more) years to think for himself and then expect him to go out into railroading, or any other industry, and knuckle down to worn-out traditions of operating practice and rule-of-thumb ways of thinking and reasoning, and that just to satisfy official pride.

It isn't low wages, nor long working hours, nor hard work that keeps college men aloof from railroading. College men will enjoy doing the job they love best just as soon as they are made to feel unreservedly at home and respected by their superior officers. R. P. KOLB.

Formerly Instructor in Mechanical Engineering at Lehigh University.

The Average Life of Ties

PITTSBURGH, Pa.

TO THE EDITOR:

I have read with interest W. F. Goltra's article entitled "What is the Average Life of Ties?", in the *Railway Age* of August 15, and have studied carefully the diagram and table used in calculating the average life. I have also corresponded with Mr. Goltra to make sure that I understood his method, which is entirely independent of actual service records of ties, on which Miss Thorne's curves (published by the American Preservers' Association in 1918) are based.

In the first place, a series of curves (or the same information in tabular form) for each year of average life is more convenient to use than a single curve reading percentages only. For this reason, Mr. Goltra's method represents an advance in the study of tie statistics. As he has not described the steps used in detail, however, I will take the liberty of explaining them.

The curves are plotted from the table below them. The columns headed P, A and T under each year of average life are developed as follows: It is assumed that the first ties are removed at about one-third the average life of the group; that 57 per cent or 58 per cent of the ties have been removed when the average life is reached; and that the last tie is removed two years short of twice the average life. It is evident that 100 ties lasting an average of 8 years will have an aggregate of 800 tie-years of service, and similarly for any other average life. With this as a basis, the problem is to distribute the renewals from year to year so that the aggregate tie-years will be 800 for 8 years, 1,000 for 10 years, etc. Mr. Goltra's figures represent one solution, but the number of possible solutions is indefinite if not infinite, especially if the figures are not restricted to integers. To illustrate this, I have placed an alternate solution for 8 years average life in parallel columns with Mr. Goltra's solution. These solu-

tions plot into equally regular curves, and theoretically there is no choice between them. Practically, the better one is that which corresponds most closely to the actual facts of tie renewal.

DISTRIBUTION OF TIE RENEWALS FOR AVERAGE LIFE OF 8 YEARS

At end of years	Mr. Goltra's Curve			Alternate		
	P	A	T	P	A	T
1	0	0	0	0	0	0
2	2	2	4	2	2	4
3	5	7	15	3	5	9
4	7	14	28	5	10	20
5	10	24	50	8	18	40
6	11	35	66	10	28	60
7	11	46	77	12	40	84
8	12	58	96	15	55	120
9	10	68	90	15	70	135
10	8	76	80	14	84	140
11	8	84	88	8	92	88
12	6	90	72	5	97	60
13	6	96	78	2	99	26
14	4	100	56	1	100	14
	100		800	100		800

P—Percentage of ties removed.

A—Accumulated per cent of ties removed.

T—Tie years in service.

I suggest the following modification of Mr. Goltra's method, which, however, may give results very similar to his: Many railroads have service records showing renewals from year to year of large groups of ties. Select several records, representing 10,000 or more ties each, with average lives of say 8, 11, 14, 17, and 20 years, and tabulate the actual percentages of yearly renewals in column P. Columns A and T can be calculated from this, and the total of column T will be correct, as the average life was deduced from it. Plot these curves on the diagram and interpolate curves for other years. The larger the number of ties we can tabulate, the nearer we shall approximate average conditions. I think we may assume that ties which have an average life of 8 years will come out in average percentages from year to year, whether they are treated or untreated, oak or pine. We cannot, however, construct a curve from only three known points, plus the sum of the variable factors. Z. M. BRIGGS, Assistant Engineer, Pennsylvania System.

Railroad Police Need Automobiles

CHICAGO, Ill.

TO THE EDITOR:

We are living in a motorized age! The registration of motor vehicles in the United States for the year 1924 totaled 17,591,981, a gain of 17 per cent over the preceding year. In the year 1895 there were no motorcycles, no motor passenger buses, no motor trucks and only four automobiles manufactured. The bicycle was the nearest thing we had to the fastest motorcycle of today. Water and rail were the only means we had of distance transportation and we depended largely on the horse and our own legs to carry us locally. In the larger cities fire fighting equipment was horse drawn; in the smaller cities and villages man power pulled the hose cart and ladder wagon. What city would tolerate such obsolete equipment today? When we see our modern equipment responding to the alarm of fire at the rate of twenty to fifty miles an hour, we look back and wonder how our fire fighters of a quarter century ago ever arrived at a fire in time to keep the city from being consumed by flames, just as some of us perhaps will look back and wonder how railroad police officers or other peace officers ever apprehended a criminal or box car thief in this motorized age equipped only with the legs God gave them.

In 1895 the railroad officer and police officer had an even break with the criminal, so far as locomotion was concerned. Loot from a box car was usually carried away and nearly all thefts occurred while trains were held at

yards and terminals. Then it was a case of wits; now it is a case of speed with the criminal in possession of a high-power motor car and the officer afoot as he was a quarter of a century ago. Nearly all of our city and state police officers throughout the country are furnished with cars equal to those of the criminal, while a number of railroads in the country allow their police departments to continue in the old way. This is not fair to the railroad officer and it is time that the managements on railroads operating in congested districts realized the conditions confronting the railroad officer today.

On January 1, 1925, there were 2,866,061 miles of highways in the United States; of this there were approximately 470,000 miles surfaced by federal, state and local aid; and 40,000 of this 470,000 miles of surfaced highway were surfaced in the year of 1924. Projects under construction by federal aid on December 31, 1924, totaled 17,837 miles, projects approved for construction 2,108 miles. The expenditures on highways in this country for the year 1924, totaled \$990,683,770. On December 31, 1924, there was in the United States and Canada, 235,063 miles of Class 1 railroads and 38,479 miles of short lines represented by the American Railroad Association, a total of 289,087 miles of railroads compared to 2,866,061 miles of highways in the United States alone and 470,000 miles surfaced. Within a few years at the present rate of expenditure on highways in this country, every mile of railroad in the United States will be paralleled with a surfaced highway as thousands of miles are today.

Our largest box car robberies are not pulled off in terminals today as they were 25 years ago. Railroads suffer their greatest loss by theft after the train laden with merchandise leaves the yard. At some designated point agreed upon by the thieves, where a surfaced highway parallels the railroad, a robber or two aboard the train enter a car by means of the rope ladder over the top, down the side and into the side door, or a seal is broken at some stop and entrance gained and at the designated point the loot is unloaded to be picked up by other members of the gang following by fast motor truck or automobile.

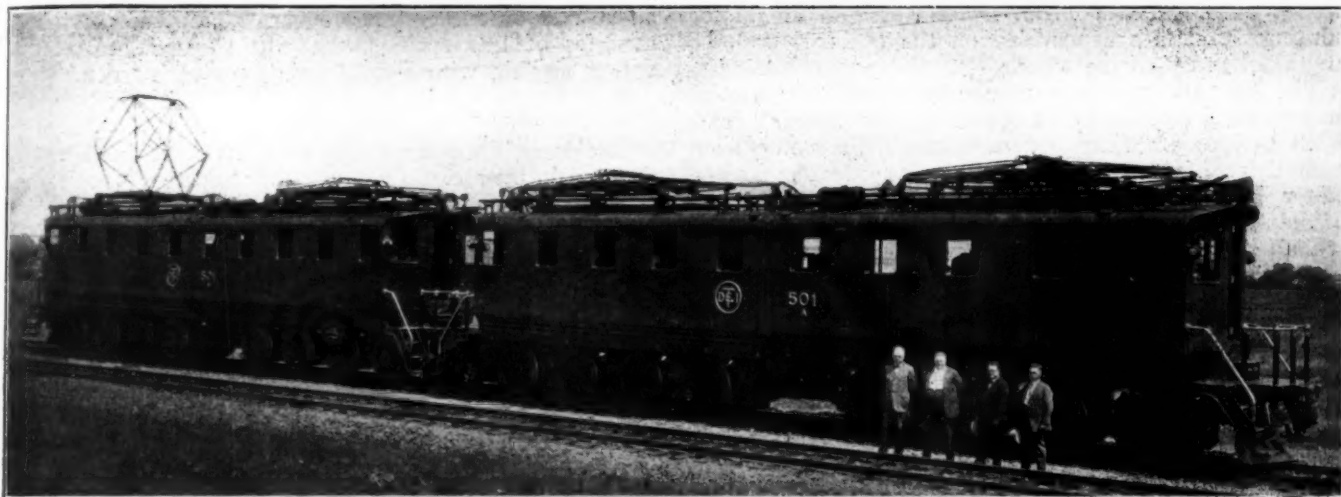
Box car thieves operating with automobiles have all the advantages over the railroad officer protecting his train by train riding. Loot is unloaded while train is moving, and by the time the officer can get off at the next train stop, even though he may observe goods unloaded, the loot is loaded into an auto or truck, and by the time an officer can get back to the scene of crime, the thieves have the loot many miles away and perhaps sold to some fence.

The well organized gang of box car thieves is making use of the automobile and using the surfaced highways that parallel the railroads to carry on their nefarious work. If a railroad police department is to be efficient in the discharge of its duties, its officers must be furnished with automobiles to combat the organized gangs of box car thieves operating on the railroads.

Quoting one of the greatest cases in the history of this country—"The three million Roudout mail robbery which occurred June 12, 1924, when C. M. & St. P. mail train No. 57 was held up by eight of the most skilled train bandits in history, one of which was a post office inspector. This robbery was perfected and their accomplishments gained with the assistance of the automobile which was used in the hauling of the mail, and also all observations of the highways were made with the automobile. Fortunately with the assistance of a motorized police department in Chicago, the thieves were apprehended and loot recovered."

I recommend that the only possible means of combating the railroad thieves is for the railroads to support their police departments in this respect. L. J. BENSON.

Superintendent of Police, C. M. & St. P. Ry. Co.



The D. T. & I. Electric Locomotive on the Test Track at the Rouge Yards

D. T. & I. Electric Locomotive Completed

Unique type of twin motive power unit has many unusual features of design

THE electric locomotive for the Detroit & Iron-ton which was described in the *Railway Age* of October 18, 1924, has been completed and placed, ready for test, on the four-mile section of the D. & I, now equipped with overhead trolley. The previous article describing this locomotive dealt principally with its electrical features, while this one, through the courtesy of the D. T. & I. Railroad News concerns particularly the many unusual features of mechanical construction.

The locomotive is of the motor-generator type. Alternating current of 25 cycles, single phase, 22,000 or 11,000 volts is supplied by the trolley and stepped down to 1,250 volts in a transformer carried in a cab of each of the two sections. It is then converted into direct current of variable voltage by means of a motor-generator which feeds eight traction motors of the direct current series type connected in parallel.

This type of locomotive also will be able to operate in the same train with any other type of alternating current locomotive and can easily be adapted for running on any 25-cycle trolley voltage, although it is especially designed for either 11,000 or 22,000-volt supply.

It is designed to develop a maximum of 5,000 hp. and a maximum starting effort of about 250,000 lb. based on a total weight of 372 tons distributed over 32 driving wheels. Normal rating is 4,200 hp. at 17 miles an hour and 3,600 hp. at 25 miles. Overall length is 117 feet, but the longest rigid wheelbase is 11 feet.

Speed control for both motoring and regeneration is very flexible. It comprises 45 steps and is effected from standstill to 17 miles an hour by regulating the main generator voltage and from 17 to 25 miles by running the motors with separate and variable excitation. The converter set is started by means of an auxiliary 60 cell storage battery from the d. c. main generator side, and brought up to half speed. The synchronous motor then

accelerates it to full speed and synchronizes the set entirely automatically.

Mechanical Design

There is a radical difference between the new D., T. & I. electric motive power unit and standard steam or electric locomotive practice in its mechanical design.

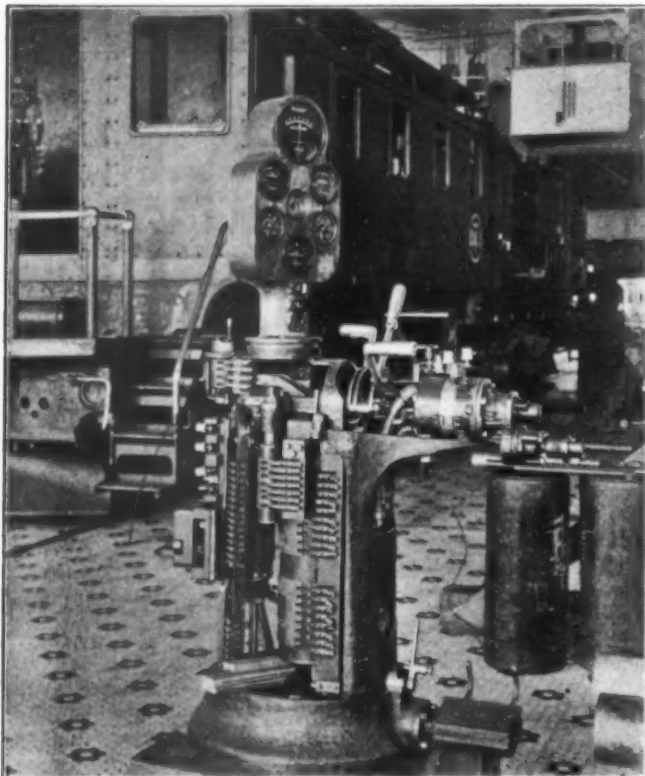
The locomotive is primarily a freight engine, of 0-8-8+8-8-0 wheel arrangement. It consists of two motive power units semi-permanently coupled together, each one carrying its own full equipment. Each motive power unit consists of two articulated eight-wheel trucks connected by a universal hinge of the ball type.

The leading truck carries an automatic oil circuit breaker, a 2,000 k.v.a. stepdown transformer, a compact group of equipment, an air compressor for the traction brakes, a blower for ventilating the traction motors and a transformer oil cooler. A centrifugal oil circulating pump for the transformer oil is also driven off the blower shaft.

The trailing truck carries a 750 r.p.m. motor generator set consisting of a 60-cycle, 1,240-volt synchronous motor, a 600 volt d. c. generator, a 75 kw., 125-volt main exciter and a 25-kw., 10-volt regenerative exciter. A compact group of equipment is placed ahead of this set while smaller groups of switches and various other equipment are located on the bulkhead between the engineman's and machinery compartment. Each power unit has 8 traction motors of the direct-current, 600-volt series, axle hung type of 225 hp. each. These motors with their gear, drive axles, and wheels form a unit and are interchangeable as an assembly as well as in parts. Each motor is geared to the driving axle by two 22 tooth $3\frac{1}{2}$ d. p. spur pinions left, and right, each meshing with a 98 tooth gear rim which is shrunk onto the cast steel wheel center. Both wheels are pressed to a 9-in. axle which rests in 2 fixed

bronze bushings each 14-in. long fitted into the motor housing. Collars are provided on the bushings to take any axial thrust of the wheels.

The journals were given generous proportions to minimize deflection of the axle and make a quiet running gear. Both pinions are flexibly connected to the motor by a quill drive of simple and efficient design. The hollow motor shaft carries the armature and rests in two bearings of standard design. Inserted, and keyed to it internally at half length is a flexible propeller shaft which has fastened to each end a driving pinion. These pinions again have shanks fitted loosely in the hollow armature shaft. Such arrangement permits the pinions to rotate relatively to the hollow shaft as well as to each other just enough to insure a good mesh with both gears, and absorb any vibrations in the drive. This mechanism was submitted



Master Controller with Covers Removed, Showing Brake Valve in Horizontal Position, Operating Levers Upright, Control Drums, Sander Pedals, Gage Board and Miscellaneous Switches

to quite a severe run on the test floor equivalent to about two years' road service and has proved very satisfactory.

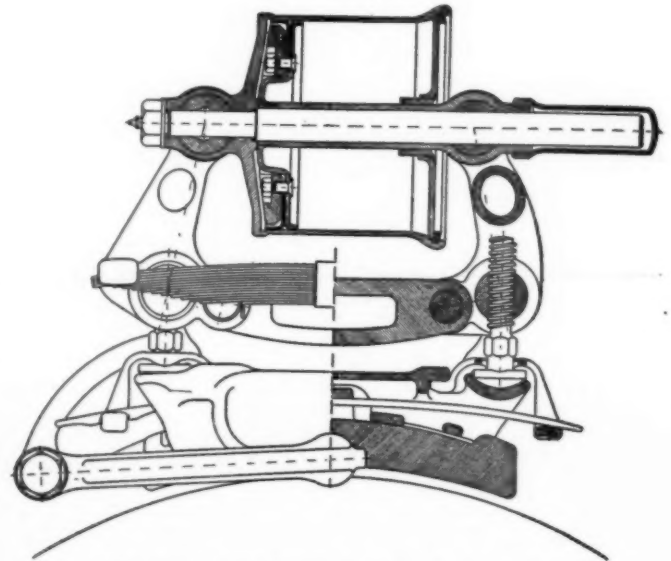
Equalization

Each motor unit is suspended in three points and guided in an additional fourth one in the following way: The tractive force of each motor is transferred to the locomotive frame by a universal ball and socket joint while the weight of the upper locomotive structure rests on two equal beams located directly above the axle. Two brackets reaching out from the motor housing serve as supports for the equal beams. In order to keep the motor units lined up on the track and prevent any lateral motion, a point opposite the universal suspension joint with respect to the axle is guided vertically in a frame extension. Only six motors for each power unit, however, are assembled this way while the leading and trailing axles have spring buffered guides to allow a maximum of 2-in. lateral motion each way in curves. The equal beams mentioned

above rest on rocker pins and are flexibly suspended on a series of leaf springs, the whole system forming a spring rigging with 5 fixed points for each truck.

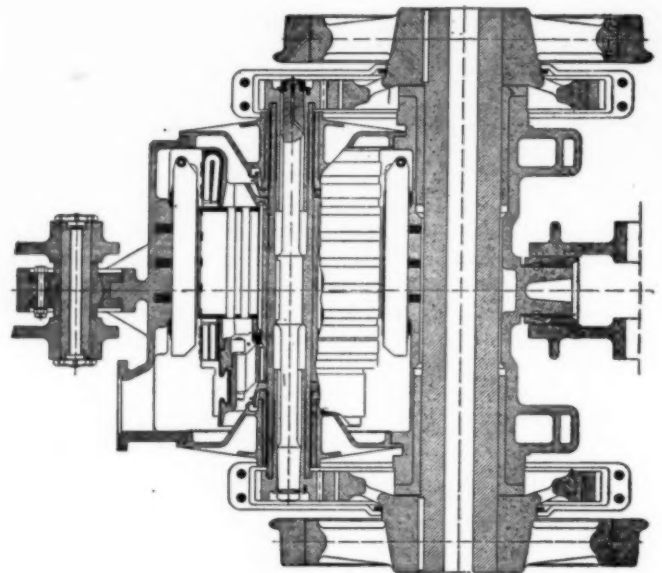
Frame

The main framework for each truck is built up of three main members, a center frame and two side frames.



Vertical Section Through Individual Air Brake

The center frame is a heavy box-shaped hollow steel casting which may be considered as the backbone of the locomotive. It is provided with suitable extensions to take care of the heavier equipment mounted directly on it, while the inside is partitioned off to form a main air



Horizontal Section Through Traction Motor. The Ball Joint Between the Traction Unit and Locomotive Frame Is Shown at the Left. At the Right Is the Square Block Which Slides Vertically in the Frame for the Purpose of Keeping the Motor Line Up With the Frame

reservoir and a supply air duct for the traction motor ventilation. The cooling air is forced into this casting by the blower mounted directly above and from there is distributed to the individual motors through flexible metal

bellows. Another large flexible canvas air duct connects the two adjoining frames across the mallet hinge.

To the left and right of this center frame casting and parallel to it are bolted two channel-shaped castings which form the outer side frame, and serve as a support for a structural steel cab platform. These channel side frames with their openings facing to the outside are used for starting battery compartments and hold also some smaller electrical and mechanical equipment. The outside of these compartments is covered by curved sheet steel hoods on hinges, which can be unlocked for access to the battery.

Transformer and Motor-Generator Mounting

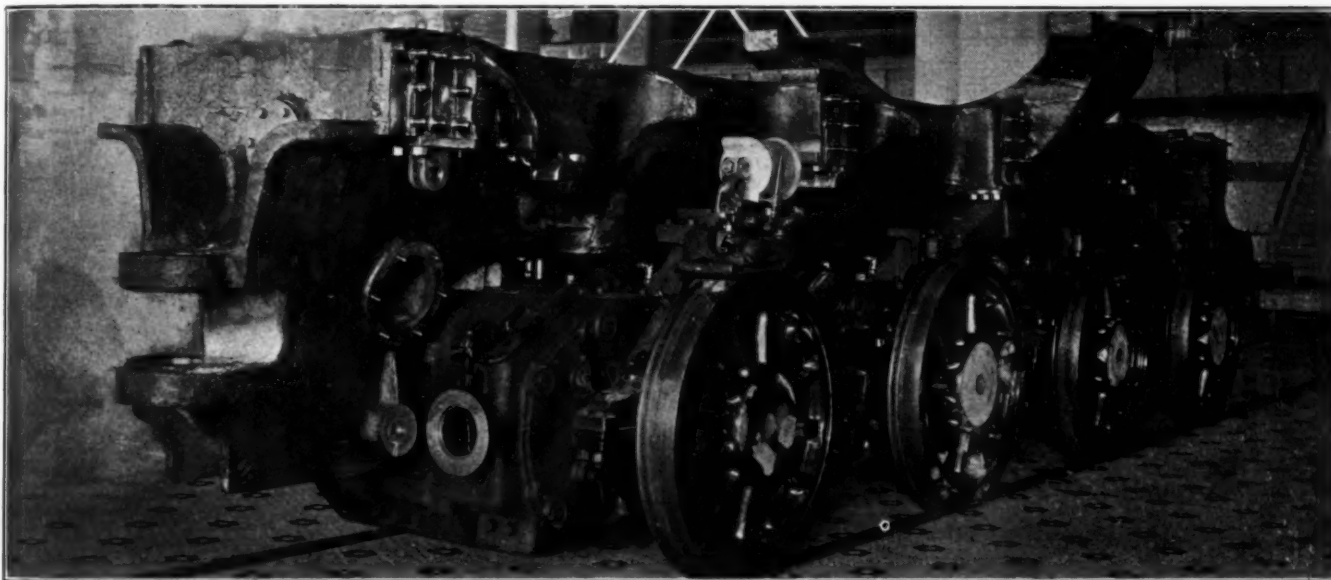
The motor generator, the heaviest part of the equipment, is designed as a unit, with generator and ventilating fan in one housing and resting on three points on the center frame casting. Both exciters are carried on shaft extensions, ventilation air is drawn through the end shields and exhausted into a funnel attached around the fan near the center of the set. The sides of the uptake as well as downtake are provided with shutters which may be manually or automatically operated either to circulate

voltage. Transformer and oil circuit breaker are designed for a maximum degree of safety against any oil explosions which may occur in them; both are also provided with emergency vents through the cab roof.

As mentioned above, cooling oil for the transformer is circulated by means of a small centrifugal pump driven off the motor blower. An oil-cooling radiator is placed on top of the traction motor blower, from which the cooling air is drawn, and exhausted through the cab roof. This blower is of the double suction type with aluminum rotor running normally at 1,650 r. p. m., driven by a d. c. motor. A control interlock will allow the blower to slow down to half speed when the speed control lever is in "Off" position.

Control Apparatus

A master controller of new and very compact design is installed on each end of each motive power unit. Due to the multiple control feature any number of motive power units may be operated from any control stand. It contains the necessary contact drums, three operating levers mounted on telescoped horizontal shafts, the air



One of the Two Running Gear Sections Which Carry the Motor-Generator Units, Showing Cradle for Supporting the Unit. Air Brakes Such as the One Shown on the Wheel in the Foreground Are Provided for Six Wheels on Each of the Four Sections.

the hot air into the cab in cold weather or exhaust it completely into the open.

The transformer, the second heaviest part of the equipment, has an oil-cooled core housed in a welded oil tank made up of $\frac{3}{4}$ -in. boiler plate. It was designed to carry the automatic oil circuit breaker in such a way that the transformer cover is actually a unit with the circuit breaker body. Series parallel connectors, to change the transformer primary from 22,000 to 11,000 volt trolley voltage, are placed inside the tank and can be easily reached through a manhole in the tank cover. Voltage and current transformers for meter and relay supply are placed inside the tank. The cable connector between breaker and transformer primary is also under cover while the cable leading from the pantograph to breaker enters the breaker casting through the roof. The protective resistance for the breaker is built into the breaker oil tank which again can be lowered for breaker point inspection by means of lift screws, gears, and a crank located on the cab roof.

The object of this unit arrangement is to eliminate from the inside of the cab all exposed leads which carry trolley

brake valve in horizontal position on a bracket extension to the right, and the sander foot control. A number of minor controls, as whistle, bell, light and reset switches, double cutout cock are also provided. A gauge board with illumination and train control lights is mounted on top of the skeleton frame and a smooth aluminum cover incloses all piping and contact mechanism.

Cab

The cab is constructed in the usual way but made of heavier stock than customary. The outside walls are $\frac{1}{4}$ -in. plates. Partitions and inside walls for the double-walled engineman's compartment are $\frac{3}{16}$ -in. thick. The two cab halves are joined by a flexible canvas diaphragm consisting of six metal reinforced folds suspended by two universal ball joints from the cab roof. The center portion of each half cab can be lifted away, while the engineman's compartment and the section nearest to the articulation remain in place.

This feature facilitates work in case of heavy overhauling. There are 8 sandboxes in each motive power unit which form part of the cab walls with filler caps on

the roof and sand traps at the bottom. All windows slide vertically in cast bronze frames. There are two large equipment assemblies, one located on supports in each half cab. Switches and relays were grouped and assembled so that nothing extends above 50-in. elevation from the floor with ample space for passages on the sides. This arrangement allows a free view over most of the apparatus and gives an appearance of roominess and neatness. All live high tension conductors and projecting parts are carefully covered with grounded, perforated metal guards in such a way that the inside of the cab may be considered as absolutely safe electrically to the personnel. All cables and most of the piping are laid within the structural cab subframe between two decks of flooring so that very few pipes or conduits may be seen. All cable crossings over the articulation are made flexible with plenty of allowance for extreme movements.

The standard pantographs are fitted with aluminum tubing protectors extending to left and right in bow fashion to prevent the contact horns from getting caught in the catenary.

Brakes

A radical departure from common practice was made in the air brake. Large air cylinders, complicated linkages and side break shoes were replaced by individual brakes for each wheel except for those of the leading and trailing axles. The object of this change was to do away with all cumbersome obstructions which are involved with the use of many links, levers, and so on.

The new design provides for a small air cylinder on top of the wheel supported on a traction motor housing extension. With compressed air admitted, cylinder and piston travel in opposite directions forcing a single brake shoe down upon the wheel tire through multiplying levers. A flat leaf spring releases the brakes when air is exhausted. The forces exerted by this mechanism will not affect the cab springs but will merely relieve the axle journals of a certain amount of weight or, in other words, a weight transfer will take place from the journal to the top of the tire.

The whole mechanism is very simple. Most of the parts are interlocking and may be taken apart with but few tools and in a few operations. All other parts of the air brake equipment are of standard design.

Entire locomotive equipment, mechanical as well as electrical, has been excellently finished. All visible bolts, railings and minor finished details are nickel-plated. The frame work, wheels and running gear up to the cab line are painted mahogany red with black trimmings while the cabs are lacquered in deep satin green. The windows are plate glass, affording clear vision in all directions.

The mechanical parts of the locomotive were designed and built by the Ford Motor Company, while the electrical equipment was designed and built to Ford Motor Company's specifications by the Westinghouse Electric & Manufacturing Company. Electrification of the first 16-mile section of the Detroit, Toledo and Ironton from the Rouge Yards to Flat Rock, which is well under way, is the initial step in electrifying the system from Detroit to Ironton, Ohio.

TRAINS ARE about 1,650 times heavier and 70 or more times stronger than average automobiles; they inevitably win collision contests at crossings. No one denies that railroad crossings are not potential hazards, but it is not the mere existence of crossings that make them dangerous—it is the reckless way in which people use them. No one would drive into the mouth of a loaded cannon which might at any moment discharge a death-dealing shell, but many a sane and sober man drives carelessly into an equally dangerous path at the railroad crossing.

Master Blacksmiths Meet At Cleveland

AN attendance of over 110 members was registered at the twenty-ninth annual convention of the International Railroad Master Blacksmiths' Association, which was held August 18, 19 and 20, 1925, at the Hotel Winton, Cleveland, Ohio. Nine reports were presented on the subjects of autogenous welding, carbon and high speed steel, drop forging, drawbars and drawbar pins, frame making and repairing, heat treatment of steel and iron, reclamation, spring making and repairing, and tools and formers.

The discussion on practically all of the reports emphasized two important factors in blacksmith shop work; namely, the development of welding, both gas and electric, and the need of modern machine tools and shop equipment. The rapid development of welding and its successful use in both manufacturing and repair work has practically rendered many former blacksmith shop practices obsolete. For example, locomotive frame parts and crane hooks can be cut out by the use of the otheograph and acetylene torch in much faster time than by the old method of forging. This development, of course, has been a big factor in reducing locomotive and car repair costs. The forces employed by quite a number of blacksmith shops throughout the country have been reduced as much as 50 per cent due to the introduction of welding. Welding is now extensively used in practically all railroad shops and many jigs and fixtures for reducing the time required for welding work have been developed.

Considerable stress was placed upon the need of annealing and normalizing the metal after the job of welding had been completed. The necessity of preheating the metal surrounding the place to be welded was also emphasized. The metal on either side of the place welded tends to crystallize owing to the heat developed while welding and unless the whole piece is normalized, breakage is liable to occur. It is, therefore, considered the best practice to preheat before welding and then normalize the piece afterwards, especially when the material is steel or steel alloy.

It was considered to be the best practice to use special steel for dies rather than to manufacture them out of scrap axles or locomotive tires. Many scrap axles cannot be hardened for die purposes and locomotive tires will not stand up to the requirements of modern machine tools. Although the utilization of scrap material for dies did not represent any considerable cost at the time of manufacture, this practice did not prove to be economical for work which involves quantity production.

Two afternoons of the convention period were devoted to inspection trips to the plants of the Acme Machinery Company and the Ajax Manufacturing Company. On Friday, August 21, the members and those attending the convention were the guests of the National Machinery Company at its second machine tool exposition at Tiffin, Ohio. A special train was provided to and from Cleveland. Sixty-two machine tools were on exhibit, of which 35 were in operation.

Election of Officers

The following officers were elected to serve for 1925-1926: President, H. W. Loughridge, P. & L. E., McKees Rocks, Pa.; 1st vice-president, L. C. H. Weideman, C. C. & St. L., Beech Grove, Ind.; 2nd vice-president, W. W. Shackford, A. C. L., Waycross, Ga.; secretary-treasurer, W. J. Mayer, M. C., Detroit, Mich. It was decided to hold the 1926 convention in Cleveland.

Is the Rail Being Improved?*

A critical analysis of the present status of this important member of the track structure

By W. C. Cushing

Engineer of Standards, Pennsylvania, Philadelphia, Pa.

AS a general rule in North America, rails are not allowed to remain in the track until they are worn so much that they are unsafe. They are needed in other tracks of different and lesser service, and the important tracks carrying heavy traffic at high speed obtain the advantage of new rail. They are thus kept in a higher degree of condition.

The rules for allowable abrasion before removal are not uniform, as the conditions of service are quite different in the many territories of operation. Generally, however, on curves 20 to 28 per cent of the head area is worn away before replacement, although on curves of 3 deg. or less, replacement will be made probably for other reasons before that amount has been lost. On tangents the practice is more variable, because in some cases rail is replaced long before worn out on account of being required in good condition for branch line service. This may be as little as $\frac{1}{8}$ in. for 85- or 90-lb. rail, and as much as $\frac{5}{8}$ in. for 100-lb. and $\frac{3}{4}$ in. for 130-lb. rail.

In order to bring about greater resistance to wear, railroads have made trials of alloy steel which require heat treatment to develop the full value of their effect, and heat treatment of carbon steel without alloy.

Manganese when raised to the amount of 10 to 14 per cent has won an important place in rail steel on account of the great toughness and resistance to abrasion of the resulting steel on sharp curves, but on account of its high cost (\$155 per ton) it is only economical for those curves of short radius where the traffic is heavy and grinds away the carbon steel in a brief period. It is not economical for tangent track or track with long radius curves. It has certain shortcomings which have not yet been overcome and which prevent its general use in rail steel. These are as follows: (1) The elastic limit is low, 30,000 to 35,000 lb. per sq. in., and a number of breakages has been recorded; (2) It is strong and tough, but the hardness is not superior to that of Bessemer steel, and consequently the resistance to batter at the ends of the rails is not altogether satisfactory.

No manganese rail of heavier section than 100 lb. per yard had been rolled up to the end of 1923, but during the current year the Illinois Steel Company has rolled manganese rail of the 130-lb. P. S. section for the Pennsylvania System.

Heavier Rail Being Used

An important step in the effort for improvement of rail service was the jump from the use of a 100-lb. rail to the heavier weights, 130, 135 and 136 lb. per yard. The first of these heavy sections was the 135-lb. rail of the Central Railroad of New Jersey which was rolled in 1910 for use on very sharp curves (40 deg. to 14 deg.), where the traffic was heavy. About 40 miles are in use, but no more will be ordered, as it is the in-

tention of the company to lay 130-lb. R. E. instead.

The 125-lb. P. S. section of the Pennsylvania was first rolled in 1915, but was changed to the 130-lb. P. S. section in 1916 by the addition of $\frac{1}{8}$ in. on the top of the head. It has been pretty well determined from the study of our records that the rail failures in 100-lb. rail are from 2 to $2\frac{1}{2}$ times as many as in 130-lb. rail. By comparing the different kinds of rail which have been laid consecutively on the same sharp curves and keeping a record of the length of service we estimate that the life of 130-lb. rail may be from 20 to 30 per cent greater than that of 100-lb. rail in the same location. No precise records of the relative cost of maintenance have been kept, but there is a general opinion among the trackmen that there is economy in the labor maintenance of 130-lb. rail over 100-lb. of from 20 to 30 per cent, which is not always taken advantage of by a reduction in forces, but in the maintenance of a better condition of track. It is well settled in our minds that the business of this company could no longer be carried on adequately on the 100-lb. rail section, where our traffic and rolling stock are the heaviest.

The Lehigh Valley began laying the 136-lb. L. V. section in 1916 and reports that it has records giving more than twice the life on curves under increased traffic than was obtained from the 100-lb. R. A-A section previously in use, and there are 10-deg. curves laid with the 136-lb. rail where no work was required in four years to readjust the line and surface.

Rail Steel Must Be Improved

In spite of this large increase in rail weight, rail failures continued to occur, but with diminished frequency, and the type of failure indicates that improvement in the quality and strength of the metal is required rather than a further increase in the weight per yard. From the study of the rail design, we find now that our effort must be concentrated upon the study of the material in order to improve it in such a fashion that it will be suitable for absorbing its peculiar stresses and transmitting the super-imposed weights to the roadbed with perfect safety. We are on the eve of another period of research, and this time into the material of construction which goes to make up the rail.

The use of various alloys has been considered, high manganese, nickel and chromium, but without heat treatment the alloys are not used to their best advantage. Nickel and chromium in rail steel have been tried by several railroads without heat treatment, but the result was indifferent, the failures in some cases being greater than for carbon steel, perhaps because the right proportions may not have been introduced. The amount of nickel alone which has been used was 3.25 to 5 per cent. The amounts of chromium and nickel together have been 2 to $2\frac{1}{2}$ per cent nickel with 0.50 to 0.90 chromium in some instances, and in others somewhat less. As chromium is a hardener, and nickel a toughener of metal, the combination ought to be good, but in all probability

* Abstracted from a report presented at the International Railway Congress at London.

they require heat treatment to bring out the good effects, as is the case with motor car steel.

Manganese steel is valued mostly for its resistance to abrasion, and has been considered already in connection with rail wear. Rails finished in the electric furnace have been tried by some railways, but without marked advantage.

Heat Treatment Offers a New Field of Investigation

Whenever a high class steel is required for a special purpose, it is made generally from ingots which were teemed with the assistance of a sink-head, with the large end of the ingot up, as it keeps the upper end hot, conducting to more uniform cooling which lessens segregation and makes sounder and denser steel. Trials of rail steel prepared in this way in 1914 and 1915 have been made with good results. There were only 171.5 head failures per 100 miles of track of sink-head rail as compared with 415.4 of ordinary open-hearth rails, but the most satisfactory part of the record is that there were only 63 broken sink-head rails per 100 miles of track against 200.6 broken ordinary open-hearth rails per 100 miles of track, showing that the sink-head not only helps to lessen head failures, but has such an effect throughout the entire ingot as to reduce the breakage as well.

It should be advantageous to use the oxidizers titanium, vanadium, silicon and aluminum, which act as scavengers to make steel more homogeneous, in conjunction with the sink-head, for the latter would help to nullify the tendency of the former to form a deeper pipe.

The production of the Sandberg Sorbetic microstructure by hardening and toughening the upper part of the head, which must undergo the greatest severity of service, by cooling it more rapidly than normal by means of an air blast controlled and directed so as to bring about the cooling in the desired portion of the head, is being tried in service by several companies, and while in general it is reported that the abrasion of the head is somewhat less than in the case of open-hearth rail, it is not considered that they have been in service sufficiently long to make definite pronouncement.

This seems to be a sort of partial heat treatment which does not appear to bring about sufficient improvement in the metal to meet the demands of the service required by the conditions of the period which is now at hand. There is the utmost necessity for great and radical steps forward.

Twenty-five years of work upon the improvement of the specifications have not brought the result required. Many changes have been introduced which have been beneficial, but the great improvement, which is increased strength and ductility to the extent necessary, has not been reached.

To attain this, study brings us to heat-treated steel. Trials of heat-treated 100-lb. and 125-lb. rails, prepared at the Altoona shops of the Pennsylvania, and by two or three of the manufacturers, have been made in the tracks of that system with encouraging results. In the service trials there is a decided improvement in the resistance to abrasion from wheels, amounting to from 12 to 64 per cent less wear. In the lots carefully prepared, there was only one broken rail.

BRITISH COLUMBIA'S salmon pack during the season of 1924 totalled 1,745,313 cases, or 400,000 larger than any pack in the previous five years. The sockeye pack, the best quality, was 39,743 cases, a gain of 8,088 cases over the previous year. The total value of all fish caught in provincial waters last year was \$21,259,956, an increase of \$461,042 as compared with the figures for 1923.

Western Rate Hearing

WASHINGTON, D. C.

THE Interstate Commerce Commission has issued a notice regarding the procedure of the hearings in No. 17000—Rate Structure Investigation, and Ex Parte 87—Revenues in Western District, to begin at Chicago on September 8, as follows:

In a notice to the public dated July 10, 1925, the above proceedings were assigned for hearing before Chairman Aitchison at the Edgewater Beach Hotel at Chicago, Ill., beginning September 1, 1925. The assignment has been changed to Tuesday, September 8, at 10 a. m., central standard time.

That notice stated that the carriers would be expected to submit as far as possible their complete proposals and evidence, and that parties others than the carriers should advise the commission on or before August 10 whether they desired to introduce evidence at the first hearing should time permit.

Few requests have been received for such opportunity. It now develops that owing to the limited time available for the first hearing the probability is that there will be no opportunity at the initial hearing for the presentation of direct evidence by shippers and the public generally. Accordingly, it has been determined that, following the carriers' presentations and that of associations of security holders or similar organizations, together with such limited cross-examination as may be appropriate at that time and the disposition of such pertinent general matters as may arise, including those concerning future procedure and the nature of evidence to be developed, an adjournment will be taken for a convenient interval. This course, which has been found successful in other general rate investigations, is necessary and desirable in the interest of orderly and concise cross-examination. At subsequent hearings, the dates and places of which will be later announced, opportunity for further cross-examination of the witnesses appearing at the first hearing will be afforded, and evidence will be received from other parties. The expectation is that at adjourned hearings, to be held at other places more convenient than Chicago for many of the parties concerned, better opportunity can be afforded for the production of testimony of more local character.

It is understood that the carriers have filed with the state commissions in the western district petitions for increases in revenue similar to those filed with this commission in Ex parte 87. A committee of representatives of state commissions will cooperate with this commission in No. 17000, which will be heard concurrently with Ex parte 87. It is assumed that at the coming hearing the members of that committee from the western district will also cooperate in Ex parte 87.

Particular attention of all parties is called to the requirements of Rule XIII of the Rules of Practice relating to the preparation and presentation of exhibits, a copy of which is annexed. We expect the cooperation and assistance of all concerned in the observance of the rule. Twenty copies of each exhibit are desired for this commission, one copy for each state commission in the western district, and one copy for each representative of a state commission sitting with this commission at the hearings, in addition to sufficient copies to supply interested parties appearing at the hearings. In addition to the information called for in the notice of July 10 the carriers are requested as far as possible to furnish in exhibit form, and at the hearing commencing September 8, if possible, a statement showing for the year 1924—

(a) Mileage operated by each Class I railroad in the respective states in the western district.

(b) The operating revenues, classified, received by each of said railroads in the respective states in which they operate, divided between intrastate and interstate traffic.

(c) A statement of the operating expenses classified as to the five major accounts incurred by each of said railroads in the respective states in which they operate in the western district.

(d) Total tons, and tons 1 mile, handled by each of said railroads in each of the respective states through which they operate in the western district.

If all of the statistics above specified are not now available, such statistics of the same general character as are available should be furnished. While the order in No. 17000 covers all rates and practices of carriers, in proceedings such as No. 17000 and Ex parte 87 there are important general issues which should receive attention before matters of interest only to a few, such as questions of alleged discrimination or prejudice between particular shippers or points. Accordingly, all parties are requested not to present evidence with respect to such local situations unless and until advised that the commission is ready to proceed with such matters in these general proceedings. Parties having such situations which they desire to present more speedily are not precluded by these proceedings from submitting them by appropriate complaint, whether now pending or hereafter brought.



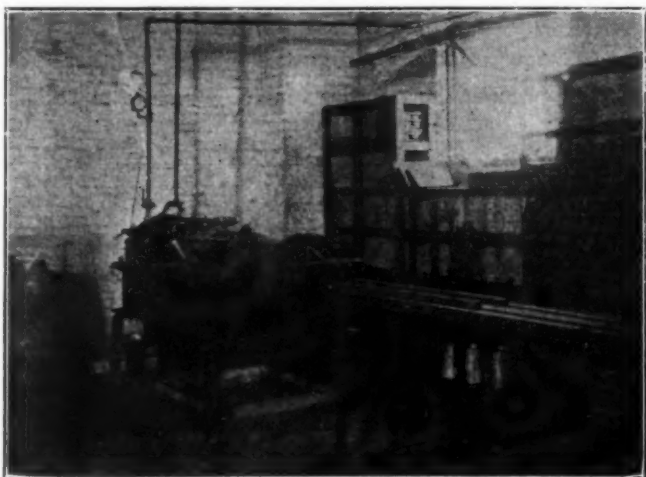
The Monon's Maintenance of Way Materials Yard Is Conspicuous for Neatness

Resourcefulness Seen in Stores Developments on Monon

Limited funds encourage special efforts to eliminate waste and prove no bar to neatness

ALTHOUGH small in comparison with the facilities of many roads and handicapped by old buildings, restricted space and limited funds, the central store of the Monon at Lafayette, Ind., embodies a number of highly interesting features in the handling

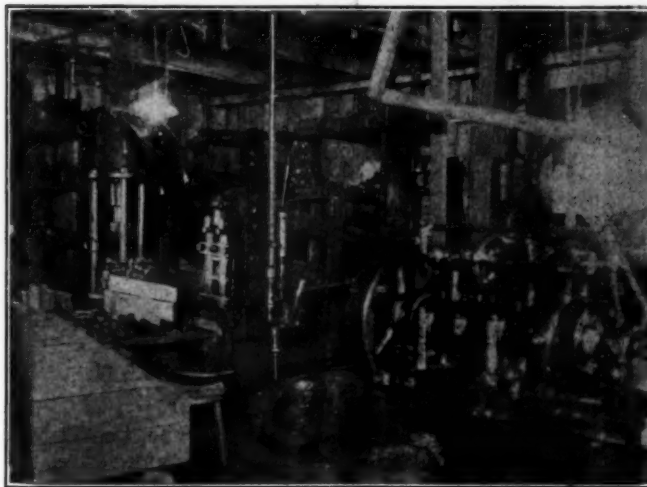
separate yard near the locomotive and car shops. This yard is conspicuous for the orderliness of the lumber stocks which are kept neatly piled, notwithstanding the lack of funds with which to build permanent foundations and permanent aisle-ways, and in spite of the height to which the piles are carried by reason of the restricted ground area, some piles being more than 20 ft. high. In storing this lumber, close attention is paid to its protection by following the A. R. A. recommended practice in the use of strips and the provision for batter. Also this lumber yard has all been graded and made ready for storage by the regular lumber yard force which is



The Hard Grease Shaper in the Oil House

of material. The efficient methods with which the material and supplies required for extensive car rebuilding operations are handled at this point have been described.* Characteristic of other features is the care taken in piling lumber, the provisions made for the storage of castings, the adaptation of the unit piling principle of stockkeeping to local needs, the special measures taken to eliminate waste, and, particularly, the orderly layout of a special yard devoted to the storage of track materials.

In the description of the Monon's car rebuilding operations at Lafayette, Ind., reference was made to the fact that all car and locomotive lumber for use over the line as well as for local consumption was stored in a



A View Inside the Reclaiming Plant at the Scrap Dock

assigned to this work whenever slack periods develop of insufficient extent to warrant a reduction in the organization.

Casting Stockade Conserves Space

The storage facilities for the small castings is one of the more recent improvements. It comprises a stockade

* See the *Railway Age* August 22, 1925, page 366.

adjacent to the car shop and consists of a rectangular area entirely surrounded by a continuous line of racks six feet high. These racks present a blank wall from the outside and are surmounted by a roof sloping outward, while on the inside they provide a series of shelving, partitioned off for the storage of the car parts. Within the area surrounded by this shelving—but not under cover—are island platforms a foot above the ground and separated by commodious alleyways for ready access by trucks. The shelving and framework of the platforms are rendered attractive by white paint. In addition to protecting the castings from becoming mixed this layout has simplified the problem of stock-taking, an accurate inventory now requiring only four hours, as compared with a week prior to the improvement.

The tray system of storing materials in storehouses is followed only to limited extent at Lafayette, but an interesting adaptation of it is being developed in the car material storehouse, where the quantity of stock carried at periods is large and its consumption rapid during car rebuilding work or when shipments are made to line points. The plan is simply to have a system of graduations marked on the side of each pocket or to provide a graduated scale for use on platform piles which, when read or applied to the pile, gives the total quantity up to the top row of material, when it is only necessary to count the loose items in the top row to determine the stock on hand. The same system is being worked out for use in taking stock of lumber.

Another feature of the car material storehouse is a raised section of the floor of the building which is built about a foot higher than the rest of the floor and is of concrete. This permits bolts and nuts and similar material awaiting shipment to be piled to the roof without danger of the piles collapsing through lack of stability attendant upon the use of less substantial flooring. Thus bolts are found piled upwards of nine feet high, while awaiting shipment elsewhere or for transfer in large lots to local points.

The general storehouse, in which all such miscellaneous materials are stored as are required for the machine

inated to accommodate changes in the volume or character of stock handled. Supplementing this shelving is a steel shipping counter which has proved especially convenient in the operations of this unit. With the restricted size of the store area, requiring full utilization of its wall space, the problem of lighting has been solved by resorting to a saw-tooth roof construction.

While store forces do not deliver the material used in the car shop, all deliveries to the locomotive shop from



A View into the Stockade for Small Car Castings with the Lumber Yard in the Background

this store as well as deliveries from the car material storehouse for light car repairs are made by store forces with the aid of an automobile truck and one tractor with specially designed trailers, the truck already having travelled 40,000 miles within the terminal area since its purchase at an expense of but \$11 so far for repairs, notwithstanding the unpaved condition of the roadways.

"Dope" Recovery Plant a Money Maker

It has become the practice on a few roads to reclaim the "dope" that is removed from the journal bearings



Two Views of the Scrap Dock which Handles from 2000 to 4000 Tons of Scrap per Month

shops and line points and which must be kept under cover, is an old building which has imposed serious handicaps upon efforts to adapt the house to present needs and advanced thought in stockkeeping. This house is noteworthy, however, for an arrangement which permits of one way operations within the house under which all material may be received on one side and line shipments or local deliveries made from the other side. The house is also distinctive for the early introduction of steel shelving, the particular advantage of which at Lafayette, aside from compactness, is in the ready facility with which partitions can be shifted or elim-

of cars upon the exhaustion of its lubricating properties. From the results obtained in this work on a road as small as the Monon there is reason to wonder why it is not done more extensively over the country. The facilities for this purpose were installed at Lafayette in 1920 at a cost of \$4,500, and are operated by one employee in conjunction with the oil house. The "dope" is received at the plant in metal drums which, when emptied, are available for outgoing shipments of fresh "dope" or other store material. The first in the process is the removal of babbitt particles or other foreign matter by shaking over a screen. This is a manual

operation. The next step is the rotary cleaner, where the waste is thoroughly laundered under steam pressure preparatory to being placed on drying racks and its eventual re-oiling for use again. The oil from the cleaner is drained into a centrifugal oil filter from which it runs into an open vat where the remaining threads of waste coming to the top are skimmed off. This oil is



Inside the Car Material Store House Where a Raised Floor of Concrete Is Built to Permit High Stacking of Unbaked Bolts Awaiting Shipment

then ready for pumping into a second vat for mixture with new oil. The clean dry waste is saturated with this mixture and placed in a press to remove any excess oil. The plant completely paid for itself in the first three months in the reduced cost of car lubrication.

Roadway Materials Yard Well Maintained

Of secondary interest only to the waste reclamation in connection with the oil house operations at Lafayette and aside from the installation there of oil measuring pumps, is the practice of molding the hard grease used

In 1914 the responsibility of the stores department was extended to the custody of all materials for maintenance of way and structures. These materials are all kept together in a separate yard, except old lumber which is stored near the car shop for convenience when sawing or mill work is required. The yard is in charge of a general foreman reporting to the general storekeeper. All receiving and shipping is performed with the aid of a locomotive crane, except small telephone and telegraph line material which is stored in a warehouse equipped with a platform car-door high. The yard includes an underground vat for paraffine-base oil, into which all spikes and bolts are dipped before storage. In connection with the operation of this yard it is the consistent practice to buy switch ties in complete sets, to treat them in sets, to store them in sets and to distribute them in sets, shipments of broken sets being made only on the order of the engineering department to fill requirements where switch sets are but partially renewed.

The conspicuous feature of the Monon's practices in handling building and track material, however, is the appearance of the yard itself. From one end to the other it is an orderly series of island platforms or skidways on which rolls of fence wire, tie plates, kegs of spikes, lumber, rail, etc., are piled with equal regularity. The island platforms consist of rectangular frameworks of second-hand bridge timbers with cinder filling, with strips of iron across the top to preserve the surface. The curbing of these platforms and the footings for the rails, lumber, etc., are painted white. The ground is surfaced throughout with lime crusher screenings from a nearby quarry and at opportune points in the yard, set off as well as protected by various arrangements of curbing, are beds of many-colored flowers. With a bluff between the yard and the car shop area, where timber cribbing has been built in such a way as to encourage the growth of vines, as well as to hold the banks from slipping, the yard would do credit to any terminal area. But situated as it is, adjacent to and within sight of passenger tracks, it is also effective in winning public favor.

Joining this yard is a scrap dock which has much to



A Partial View of the Track Materials Yard with One of the New Rests for Rail, Legs, etc., in the Foreground. Right—the Incline Down to the Track Materials Yard Is Paved with Iron Borings

in locomotive journals and on driving rods. The machinery for this purpose was improvised from a cylinder which was installed in a horizontal position and fitted with an air operated piston and a special head with an opening through which the grease is forced. Detachable dies on the face of this head shape the grease into round sticks for rod cups, flat sticks for replenishing the supply in the grease cellar or large molds for completely filling empty grease cellars.

commend it. It consists of a timber structure 50 ft. wide and 450 ft. long which has been built out from the side of the bluff, bordering the material yard so that the floor is car-floor high. A single track is laid down the center of the dock and is flanked on either side by a series of timber bins large enough to handle all scrap accumulations and sufficiently numerous to allow sorting according to the A. R. A. standard scrap classification. From 2,000 to 4,000 tons of scrap are handled on

this dock per month at an average cost of from 80 cents to \$1.10 per ton and occasionally running as low as 47 cents. The organization consists of a foreman and three employees assisted by a locomotive crane which operates on top of the dock. Electricity for the magnet used on this crane is generated at the shop and made accessible at plugs installed at every third bin. All repairable spikes and bolts recovered from the scrap are reclaimed in a building at one end of the dock where an air hammer, an air-operated bolt cutter, a triple headed bolt threader and a six-spindle nut tapper (all second-hand equipment) are installed. This does not include certain other material recovered from scrap which is repaired in the shops.

Access to the dock and the material yard from the shop area, which is situated on a much higher elevation, is afforded by an inclined roadway which has a slope exceeding seven per cent and which was originally a source of difficulty from a transportation standpoint. When the timber construction of the incline failed to keep the natural surface from slipping and from becoming impassable during wet weather, cinders were applied and subsequently crushed stone, with a binder. But all these efforts proved of little avail until the incline was surfaced to a depth of four inches with cast iron borings and turnings, which were mixed with salt to encourage rusting, and thoroughly watered. The result has been an inexpensive pavement which has been a source of decided value to the stores department in its operations.

Preliminary Report on New Haven Train Control

WASHINGTON, D. C.

E. H. DE GROOT, JR., director of the Bureau of Signals and Train Control Devices of the Interstate Commerce Commission, has written to E. J. Pearson, president, New York, New Haven & Hartford, regarding the preliminary inspection of the installation of the Union Switch & Signal Company's automatic permissive train stop system and the general Railway Signal Company's automatic train stop device on the 24.3 miles of double track located between New Haven, Conn., and Newington, Conn., on the Hartford division. As a result of this inspection, the following criticisms and comments are offered.

1. It was suggested that the cut-in feature at the beginning of train control territory in this installation be carefully considered with a view to possibly securing increased protection in case the locomotive device should become defective while in non-equipped territory, and that this protection might be of such character as to result in a penalty brake application should the device for any reason fail to cut-in automatically.

It was also suggested that more and better facilities be provided and care used to insure that all equipped locomotives are properly tuned and in good working order before leaving the terminals at New Haven, Hartford and Springfield. These suggestions were based upon failures observed in connection with locomotives 1374 and 1028 on May 4, 1925, and locomotive 1374 on May 7, 1925, the train control equipment of each having failed to cut-in automatically upon entering train control territory, due, respectively, to a guarded condenser, the grounding of receiver leads, and the grounding of a condenser terminal post. The result was that these locomotives ran over train control territory with the device cut out.

The second suggestion is also based upon the undesired stops experienced with, and the erratic behavior of, the cab signal of locomotive 1319, May 7, 1925.

Our engineers were informed that these suggestions would be met by the installation of "After-trip inspection tracks" and "Before-trip inspection tracks," the installation of these tracks to be made promptly on receipt of expected material. In connection with the use of these tracks, it was proposed to adopt and follow

a definite system of tests, inspection, sealing, and record, to insure that no locomotive should depart upon its run, or otherwise enter train-control territory, without the train-control device being cut into service.

2. Careful investigation should be made to ascertain, beyond doubt, the cause of certain undesirable operations noted during our engineers' observations of this installation, and with which your representatives are acquainted. The basis for this suggestion is the irregularities observed in connection with locomotives 3331 and 1319, on May 11, locomotives 3332 and 1028 on May 12, 1925, and other similar cases in which the devices did not function as intended; as for example, the numerous instances of red cab signal indications at clear signals, and of undesired brake applications at other times.

3. It was suggested that for the reasons given below, a change be made in the control of the 140-cycle current at siding and crossover switches. This suggestion was based upon the observation of our engineers during the inspection that while the opening of a switch at a distance greater than about one hundred and fifty feet ahead of a train resulted in the display of a red cab-signal with the proper resultant brake application, when the switch was opened with the locomotive within the critical distance named (approximately 150 feet), the green cab-signal was maintained until the receiver coils passed over the frog. For example, on May 11, when the switch north of signal 17.2 was opened for the siding, the cab-signal of locomotive 3331 gave a green indication under these circumstances until the receiver coils were passing over the frog. A similar case occurred later with the same locomotive at the Quarry siding.

Your representatives did not feel that this involved a question of safety, but did state that they desired to overcome the necessity for reacknowledgment in taking siding, and, while our engineers were present, installed an insulated joint in the track at a point adjacent to the switch points, looping the track circuit through the contacts of the switch box so as to intercept the track circuit when the switch was opened for movements to or from the siding. A test of this arrangement showed that it overcame the difficulty, and it was understood that the suggestion would be met by adopting this plan.

4. Note: The following paragraph refers specifically to the Union Switch & Signal Company's device.

While no trouble from freezing was reported or observed on this installation, it is suggested that consideration be given to the location or housing of the pneumatic portion of the device so as to prevent the possibility of failure to function due to freezing.

5. Note: The following paragraph refers specifically to the General Railway Signal Company's device:

On account of the possibility, under certain conditions, of nullifying the automatic brake application with this device, it is suggested that the method employed for limiting the amount of the brake pipe reduction be so modified as to remove this possibility. We have been informed both by representatives of the train control proprietor and by your representatives that this criticism will be promptly and satisfactorily met.

The object of this and other preliminary inspections is that of constructive criticism; the pointing out of such matters as may be helpful to the carrier in checking an installation against the specifications and requirements of the commission's order and comments concerning such other related points as our necessarily brief inspection may develop. The foregoing criticisms and comments are offered accordingly. They are not intended, nor are they to be taken, as a condemnation of these or any other devices in connection with which they or similar criticisms may be offered.



Tile Lines Cure a Wet Cut

Experience on Atlanta & West Point clearly demonstrates the value of thorough drainage

AT the top of a hill a half-mile east of the station at LaGrange, Ga., on the main line of Atlanta & West Point, is a cut that has given the maintenance of way department an untold amount of trouble ever since the road was constructed because of the constant presence of water in the roadbed. Before the advent of modern heavy power and equipment, it was possible to keep this track in condition only by raising it and placing

From 30 to 40 trains pass over the line every 24 hours, of which 12 are passenger trains, 6 being through trains with from 12 to 14 Pullman and day coaches. The decision to place a new de luxe extra-fare train—the Crescent Limited—in service between New York and New Orleans led to the decision to adopt measures to effect a permanent cure in this cut instead of continuing to provide temporary relief as had been done so many times before. It was, therefore, decided to install adequate drainage measures and work was undertaken in September, 1924.

Ballast pockets were found to extend as much as five feet below the base of the rail, being deepest directly under the rails, a little higher in the center of the track and working to the surface in "heave lines" a few feet from the ends of the ties. After holes were sunk to a depth of about six feet they were left open for an hour in which time seepage water would fill them level with the bottom of the ties. The entire cut was found to be water soaked, water showing in the surface of the ground in many places.

It might seem from this condition that the cut was not properly ditched but this was not the case. Good open ditches dug to grade were located about ten feet from the rail and about three feet below the rail, carrying a considerable quantity of water. Yet water stood in the track 2½ ft. above the bottom of these ditches, unable to escape



Fig. 1—Typical Wet and Swampy Conditions Prevailing Alongside the Track About Ten Feet From Rail Prior to Installation of Drainage

additional ballast under it at frequent intervals. However, even these measures became ineffective with the increasing weight of power and of trains of late with the result that during the last five years it was almost impossible to maintain this track in a safe condition at reasonable expense.

Trouble developed at the most unexpected times. Track that was in good condition at night would be found to have settled and gone out of line to the point of endangering traffic by the next morning. It required constant watching, especially during periods of wet weather. The section gang made it a practice to work in this cut every Saturday regardless of how dry the weather was and in a rainy season they worked here as much as four and five days a week and even then could not keep the track in condition. Furthermore, the churning of the track was continually cutting the ties under the rails, necessitating the use of additional and heavier tie plates, the more frequent renewal of ties, etc.

The traffic over this line is heavy for it is the direct route for through trains running between New York and New Orleans over the Southern and the Louisville & Nashville.



Fig. 2—Photograph Taken at the Same Place as Fig. 1 Ten Days After Pipe Was Laid

on account of the beaten strata of puddled moving clay in the "heave lines." This indicated that open ditches or side drains alone could not cure a condition of this kind, but that it also required laterals under the track to tap these pockets and provide an outlet for the water.

Determining the Grades

When the deepest pocket was found, it determined the depth to which the pipe lines should be made. Levels were run and grade stakes set so that the bottom of the pipe when laid would be at least one foot below the bottom of the deepest pocket and the pipes were laid strictly to grade throughout the entire job. The fall was sufficient to permit

the pipe to be laid on an average grade of 0.7 per cent, for although probably half of this grade would have been sufficient, it was considered advisable to take advantage of all of the fall possible.

Two lines of eight-inch bell and socket sewer pipe were laid for outlet lines, one on either side of and parallel with the track and approximately 11 ft. from the center. The trench was dug only wide enough to permit the men to work with ease, from 18 to 20 in. Owing to the nature of the soil and to its saturated conditions, some caving of the main trenches was encountered and it was necessary to do some curbing. The trenching was begun at the outlet and progressed up-grade. As fast as it was excavated to its correct depth, a few joints of pipe were laid with the bell end up-stream and with open joints (that is, without calking or cementing on the original bed of clay). At the points where laterals were to be laid under the track, 8-in. by 6-in. tee joints were placed in the main pipe line and each marked with a stake. After the pipe had been laid clean engine cinders were placed in the trench and

grade. A clay disc, or stopper, was placed in the upper end of each lateral to prevent sediment from washing into the pipe. These lateral trenches were backfilled completely with clean engine cinders. The track was jacked up and the ties respaced and tamped, leaving the track slightly high at those points. The first train over settled it and in this way any unevenness in the surface of the track on account of these excavations was prevented.

Heavy Discharge From Pipe Lines

The pipe lines were hardly in place until water began to pour from the outlets and the entire cut began to drain. It was estimated that the flow at the beginning exceeded 100 gal. per min. and in the eight months since the pipe lines have been completed water has flowed continuously, even though the weather has been unusually dry during some of the intervening period.

In contrast with the time of the track force which was required prior to the installation of this system, the pipe laying was finished early in October of last year. By the middle of November the track was well settled and was given a final surfacing since which time it has received no attention with one exception when flood water did some damage.

In spite of this fact the track is now in better condition than for years and more than 90 per cent of the maintenance has been saved.

In spite of the marked benefits which have been secured, this work, was done at relatively small cost. It was handled with company forces which laid 3,206 ft. of pipe, including both mains and laterals, at a total cost of approximately \$1,500. This included the labor of trenching, laying the pipe, backfilling, unloading cinders and cleaning up the cut after the work was finished, as well as the cost of the pipe and its freight, two small concrete headwalls at the outlets and the charge for engineering and supervision. The total number of hours of labor expended amounted to 1,555 or equivalent to the time of 12 men working 13 days of 10 hours each.

This work was handled under the direction of O. T. Nelson, chief engineer; J. A. Johnson, roadmaster, and W. E. Pitts, supervisor, in accordance with plans submitted by representatives of the W. S. Dickey Clay Manufacturing Company, Kansas City, Mo.

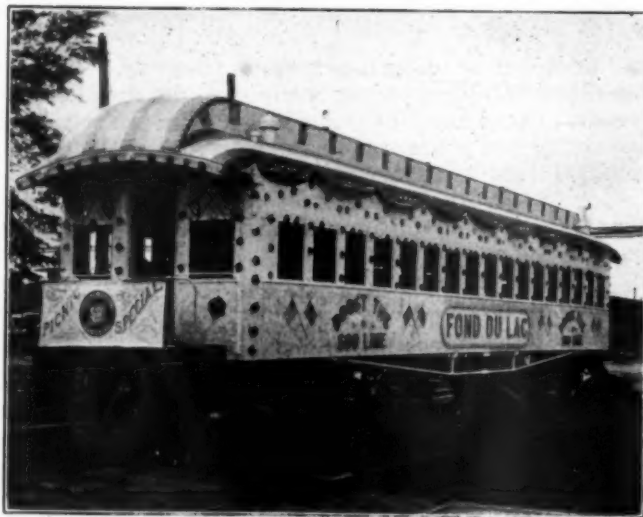


Fig. 3—Installing Laterals at Intervals of Twenty Feet Through the Cut

tamped around the sides of the pipe up to the spring line. Then more cinders were placed until the pipe was covered to a depth of six or eight inches. The remaining portion of the open trench was back-filled with the earth that had been excavated. These main pipe lines began to gather and carry away water immediately and within a week the surface of the ground alongside the track was completely dry.

Laying the Laterals

As soon as the main or outlet lines were finished, the construction of the laterals was started at the lower end of the cut. These were placed at intervals of 20 ft. and staggered. Each lateral extended from a tee connection in the main pipe line at right angles to a point approximately under the second rail. The laterals were laid practically five feet below the base of the rail. The excavation for these laterals was extended some two feet beyond the end of the pipe, or out beyond the end of the ties. The pipes were laid with about three or four inches of fall to each lateral, care being taken to maintain a true



One of the Specially Decorated Cars Used to Convey Fond du Lac and Stevens Point Shop Employees of the Soo Line to Their Annual Outing at Waverly Beach, Wis.

O.-W.R. & N. Train Control Approved

Found to meet I. C. C. specifications with certain exceptions—Commissioner McChord dissents

WASHINGTON, D. C.

THE Interstate Commerce Commission, by Division 1, Commissioners McChord, Esch and McManamy, has issued its report after inspection and test of the automatic train-control system of the Union Switch & Signal Company on the first division of the Oregon-Washington Railroad & Navigation Company, approving it, with certain exceptions as to which modifications are required, as meeting the requirements of the specifications of the commissioner's order of June 13, 1922. Commissioner McChord wrote a dissenting opinion, saying the reliability of the device has not been established.

This is the third case in which the commission has approved installations completed under its order of June 13, 1922, the two previous ones being those of the Chicago, Rock Island and Pacific and the Chicago & Eastern Illinois.

The device is an automatic train control (two-speed) of the continuous-induction type. The installation inspected and tested was completed on January 1, 1925, and placed in service on March 31, 1925. It extends from East Portland, Oreg., to The Dalles, Oreg., a distance of 83.6 miles. That portion of the division between East Portland and Crates, Oreg., a distance of 81.1 miles, is single track and that between Crates and The Dalles, a distance of 2.5 miles, is double track. There are 33 locomotives equipped with the device.

The automatic-signal system on this division was installed in 1908 and consists of the Union Switch & Signal Company's two-position, lower-quadrant, normal-clear, style B, electric semaphore signals, approach electric lighted, and controlled through line and track relays. Red, yellow, and green are the night indications for stop, caution, and proceed, respectively.

The track element of the train-control system is a combination of a track transformer secondary, a resistor or reactor, the track leads, the running rails, and the front wheels and axles of the locomotive. The point in the rear of a signal to which the signal controls the train-control alternating current is termed the braking or B point. On single track the 110-volt energy from the secondary of the line transformer is carried into the signal case where it breaks through a circuit controller on the signal mechanism, a contact of the signal or track relay, and is then impressed on the primary of a 10 v. a. track transformer. One tap on the secondary of this track transformer is connected to one track to lead of the track circuit just in the rear of the signal. Another tap on the secondary of this track transformer is connected through an 8-ohm resistance unit, to the other track lead of the track circuit just in the rear of the signal. At the other end of this track circuit the secondary of another track transformer, whose primary may be controlled as noted above or through the advance track relays, has one of its taps connected to one of the track-circuit leads. Another tap on this secondary is connected through a 2-ohm reactor, the track battery, and the track-battery resistance unit to the other track lead. The taps on the transformer are so selected that the secondaries "buck" each other, and an alternating current of a proper value flows in the track rails when the rails are shunted by the train.

On double track the 110-volt energy from the second-ary

ary of the line transformer is carried into the signal case where it breaks through a contact of the track relay, and a circuit controller on the signal mechanism and is then impressed on the primary of a 10 v. a. track transformer. One tap on the secondary of this track transformer is connected through a 2-ohm reactor to one track lead of the track circuit just in the rear of the signal. Another tap on the secondary of this track transformer is connected through the track battery and the track-battery resistance unit to the other track lead of the track circuit just in the rear of the signal. The train-control current in no way interferes with the operation of the d. c. track circuits. One or more track sections in the rear of a signal may be controlled in this manner by the circuit controller on the signal so that any required distance in the rear of the signal may be devoid of train-control energy when the signal is at stop. Any other track sections between the signal and the next signal in the rear are similarly energized except that the train-control energy in the rails is not dependent on the position of the signal. The track transformers, resistances, and re-actors are mounted in signal cases or relay boxes.

On the St. Johns branch, near Troutdale, special loop circuits are installed on both the main and passing-siding tracks for a distance of 250 feet to provide for cutting the train-control apparatus out of service electrically on leaving train-control territory. A $\frac{1}{4}$ by $1\frac{1}{4}$ inch galvanized-iron strap is lagged to the ties and runs along near the inside base of the rails. A current of proper value fed from a track transformer always energizes the loop.

A similar loop circuit 150 feet in length is provided for eastward trains just in advance of signal 838, this being the east end of train-control territory for eastward trains. Small signs are located on the roadside near these loops to designate the cut-out points. A permanently energized cut-in section is located on the westward track east of The Dalles passenger station.

After a description of the locomotive apparatus the report continues as follows:

Operation of the Train-Control System

The system being properly installed, electrically energized and pneumatically charged, the operation is as follows:

With the receiver positioned over the track rails in which the control alternating current flows down one rail toward the locomotive, travels across the first wheels and axles, and returns down the other rail away from the locomotive, the cab signal will show a green light, indicating that the device is in the high-speed condition.

In a clear block.—With the block unoccupied and an alternating current flowing in the track rails, the current induced in the receiving coils will be amplified and split in phase so as to hold the train-control relay closed. The magnet valve will be energized, thereby maintaining the pneumatic apparatus in the high-speed condition. The green cab signal will be displayed, indicating to the engineer that he may proceed at any speed. As the train proceeds through the clear block and passes from one track section into another, each track section having an alternating current flowing in the track rails, the green cab light will continue to indicate a high-speed condition.

Between the braking or B point and the stop signal.—When the locomotive passes a B point and enters track sections in which there is no alternating current flowing in the track rails no current will be induced in the receiver coils. The train-control relay will be deenergized and the cab signal will change from a green to a red light. The magnet valve will be deenergized, allowing the pressure from the blow-down reservoir and diaphragm cham-

ber of the timing valve to escape to atmosphere through an exhaust port in the speed governor, which port is variable in size according to the speed, and the pressure in the blow-down reservoir will be so decreased as to cause the timing valve to operate in from 6 seconds for speeds of 35 m. p. h. or higher, to 40 seconds for speeds of 20 m. p. h. or less. If the engineman acknowledges the change in conditions by operating the acknowledging valve and makes a manual brake-pipe reduction of sufficient amount to produce a full-service application of the brakes, the automatic brake application will be suppressed.

If the manual reduction is not of sufficient amount to make a full-service application, or if the engineman does not keep the brakes applied long enough to bring the train below the low speed limit, even if acknowledged, an automatic brake application will follow. If the change in indication is not acknowledged by the engineman, an automatic application will follow immediately at the end of the delay time and cause a full-service application of the brakes. In all cases the brakes must be manually released and the speed must be below the low speed limit of 20 m. p. h. In order to release the brakes, the engineman must first place the brake-valve handle in the lap position, allowing it to remain there a few seconds until the automatic train-control valves, etc., have been restored to normal, after which the brakes may be released in the usual manner. During the automatic brake application the condition of the apparatus is indicated by the air gauges. After releasing the brakes below a speed of 20 m. p. h. the locomotive may proceed through the remainder of the section at a speed not in excess of the low speed limit. If the engineman attempts to exceed the low speed limit, air from the pilot-valve spring chamber will start to exhaust to atmosphere at the governor and an automatic application of the brakes will result, which may be manually released, as before, when the speed of the train has again been reduced to less than 20 m. p. h.

In a stop block.—When the locomotive passes the insulated joints at the stop signal and enters the track section beyond the stop signal, the track sections to the potential stopping point, i. e., train in the block, open switch, etc., will be devoid of alternating current and the train-control apparatus on the locomotive will remain in the same condition it was just before passing the stop signal. When the condition preventing the flow of alternating current in the track rails is removed, alternating current will again flow in the track rails, the cab indication will change from red to green, all the train-control apparatus will be restored to the high-speed condition, and the train may proceed without limitation of speed.

At a cut-out loop.—When the train passes from equipped to non-equipped territory the locomotive receiver passes over a special loop circuit in which there is always flowing an alternating current of high value. If the engineman operates the cut-out switch while the receiver is passing over this loop, the cut-out relay will be picked up. After passing the cut-out loop the train-control relay will drop because of the absence of current in the track rails, allowing the cut-out relay to remain energized. The train-control apparatus is thus electrically cut out, and this condition is indicated by both lights in the cab signal being extinguished.

On entering equipped territory.—On entering train-control territory after having been electrically cut out, the receiver passes over a track section which has an alternating current flowing in the rails at all times for the purpose of cutting the device in service automatically. Current will be induced in the receiver coils, the train-control relay will pick up, the cut-out relay will drop, a green cab light will be displayed, and the train-control apparatus will be cut in service automatically, allowing the engineman to operate his train at speeds in accordance with the cab-light indications.

Running backward.—When the locomotive is running backward the reversing switch contacts, which are operated by the reverse lever, will open and break the receiver-coil circuit so that a red cab light will be displayed and the low speed limit will be imposed irrespective of alternating current in the track rails.

The purpose of this inspection and test was to determine whether or not the installation was made in accordance with the plans furnished by the carrier and the specifications and requirements of our order.

At the time of the inspection five passenger and two freight locomotives were fully equipped as stated above. Two passenger and two freight locomotives were fully equipped, with the exception that they had no pressure-maintaining valve. Three passenger and one freight locomotives were fully equipped, with the exception that the locomotive wiring was installed as per U. P. plan S. D. 220-A. Nine passenger and nine freight locomotives were fully equipped, with the exception that they had no pressure-maintaining valve and the locomotive wiring was installed as per U. P. plan S. D. 220-A.

It was found that the 22 locomotives wired in accordance with the U. P. plan S. D. 220-A would not cut out electrically. The wiring as per plan U. P. S. D. 220-B corrects this condition,

and it is understood that all of the locomotives will be wired in accordance with this plan as rapidly as possible.

A test was made with locomotive 3212 to determine whether it would cut out electrically on the cut-out loop on the St. Johns branch. It was found that the device would not cut out electrically, due to the locomotive being wired in accordance with U. P. plan S. D. 220-A. The wiring on this locomotive was changed to conform to U. P. plan S. D. 220-B and a test conducted on this loop on April 3 resulted in the device cutting out electrically, as intended. A test was also made to determine whether the device would cut in electrically on this loop and it was found to operate as intended.

The common return for the cut-out relay holding coil is not opened when the cut-out switch is secured in the cut-out position after the device has been electrically cut out, and under these circumstances a train could reenter train-control territory without the device cutting in automatically. It is understood that new cut-out switches of improved design are to be installed on all locomotives to overcome contact difficulties experienced with the present switches, and an additional device will be provided in the new switch so that the common return of the cut-out relay holding coil will be opened when the switch is operated.

The cut-in feature at the entrance to train-control territory for eastbound freight and westbound passenger trains is designed and operated upon the open-circuit principle, and while the cab signals are intended to apprise the engineman of a failure of the device automatically to cut in, this method involves reliance upon the human element.

It was noted that when a locomotive was moving in a clear block, the opening of a switch in advance resulted in the imposition of a low-speed restriction as intended, with a red indication of the cab signal. This continued until the locomotive reached a point where the rail-shunting capacity of the locomotive wheels and axles became greater than that of the track leads and switch-box contacts, when the apparatus automatically was restored to high-speed condition and the cab signal cleared.

No interference from foreign-current influences was reported, and none observed during the inspection, nor was there any evidence of foreign current having been existent at any time. However, effective means should be provided for preventing such trouble should such foreign current develop.

It was noted that no provision was made to require the engineman to acknowledge at succeeding stop signals.

The pneumatic portion of this device which contains the numerous functional parts essential to affect a brake application are located outside the cab, and hence are subject to the effects of outside temperatures at all seasons of the year. Unless adequately protected during freezing weather these valves may freeze in such manner as to result in failure to function.

In six out of eight trials with the device the split-reduction feature failed to function. During these tests the reduction-timing valve first tested was removed, and another, said to be in perfect condition, was substituted, but in two trials out of three the substituted valve failed to function as intended.

In cases where this feature failed to split the brake-pipe reduction about 1.5 seconds more time was consumed by it in making a 30-pound brake-pipe pressure reduction from an initial brake-pipe pressure of 80 pounds than is required by the engineman's automatic-brake valve.

The split-reduction mechanism, even if it had functioned as intended, appears to us to be objectionable in that it interposes an obstruction to the free exhaust of brake-pipe air in automatic applications of the brake.

A test made to determine whether or not a closed main reservoir cut-out cock draining the air supply to pipe No. 1 would cause an automatic brake application, resulted in failure to secure such application.

Exceptions

As a result of this inspection and test, it was found that the installation meets the requirements of our specifications and order in *Automatic Train Control Devices, supra*, except as noted below, and it, therefore, is approved, except as hereinafter indicated.

1. Those locomotives, the train-control equipment of which is not in accordance with U. P. plan S. D. 220-B, as above, must be equipped in accordance with such plan, to warrant approval.

2. All locomotives must be provided with cut-out switches which will, when operated, open the common return of the cut-out relay holding coil.

3. All locomotives must be provided with pressure-maintaining valves.

4. Provision must be made requiring enginemen to acknowledge at succeeding stop signals.

5. The pneumatic portions of this device containing the functional parts essential to brake application, and which are located outside of the cab, must adequately be protected against freezing, because if these valves should be sealed closed in normal position, the result might be serious.

6. The electro-pneumatic valve stem in use apparently offers opportunity for sticking and freezing shut. The improved type should be substituted.

7. The main reservoir cut-out cock draining the air supply to pipe No. 1 should either be so designed as to result in an automatic brake application if closed, or a single-cut cock in the main-reservoir pipe should be substituted for the one first described and that in the pipe leading to the engineer's brake valve.

The Oregon-Washington Railroad & Navigation Company is expected to comply at once with the above-stated requirements and promptly and currently to inform us as to the progress made in conforming thereto.

The shunt circuit as used in this installation to impose a restricted speed limit when a switch is open, is passed with the understanding that the arrangement of the shunt circuit at cross-over and turn-out switches, including the lead wires, bonding, and switch-circuit controllers, must be so installed and maintained that an imposed low speed limit due to an open switch shall not be released at such distance from the open switch as to permit the speed of the train to be so increased as to introduce an element of danger. Should this arrangement be found unsatisfactory or impracticable to maintain, other means of protection must be applied.

Certain situations were noted which, in our opinion, should be kept in mind by the railway company in order to prevent any possible failure properly to protect train operations in connection therewith:

1. Should foreign alternating-current trouble develop it is considered essential that effective means shall promptly be applied to overcome it.

2. Inasmuch as the split-reduction feature repeatedly failed to function during the tests, and in such cases increased but slightly the time consumed in automatically reducing brake-pipe pressure 30 pounds from an initial pressure of 80 pounds, as compared with a manual reduction, the carrier may desire to consider whether the simplification which the elimination of this feature would permit is or is not desirable.

The attention of the Oregon-Washington Railway & Navigation Company officials accordingly has been called to these matters.

Commissioner McChord in his dissenting opinion said in part:

Dissenting Opinion

The original order and specifications adopted by the full commission were entered more than three years ago, and this is the kind of device proposed by the carriers at that time. Division 1, of course, gets its authority to act in this matter from the commission, and it must be conceded that we have no authority to do more or less than required by that order as amended by the order of July 18, 1924, that is, to inspect and approve or disapprove "each installation made pursuant to this order when completed." When this matter was considered by division 1, I was of the opinion that in justice to the device itself upon the showing made, instead of approving this installation with certain vital exceptions as to the device, that the proper thing to do, especially in view of the short time that it has been in service on this road and the longer times on the others as herein stated, would be to call upon the proprietors and the carriers to cure these defects if they can, instead of issuing a report which in effect approves a part of the device's installation and disapproves the other part.

In looking through the record I find that several of the large carriers who have installed this device have had various things to say. I quote briefly from a few of their communications.

The chief signal engineer of the Atchison, Topeka & Santa Fe, under date of April 7, 1925, says:

"Among the big things is interference by induction or leakage. Glancing over a recent record for the week ending March 31, I note several instances of stops in Galesburg Yard. We are reasonably sure that these stops were due to interference of some kind; to be perfectly candid they possess false clear potentialities."

Another letter from him, dated May 6, 1925, says:

"There is no change in the false clear or potential false clear situation. We have had two bad thunder storms, both of which caused considerable trouble."

And another, dated June 8, 1925, says:

"It has been more or less definitely proven that proper shunting on side tracks can not be obtained with the ordinary circuits used. This is in the nature of a false clear situation. We have given consideration to series circuits from the switch to the fouling point."

This device has been in operation on the Atchison, Topeka & Santa Fe Railway since January 1, 1925, upon an installation of 104.5 miles. This carrier's reports indicate that it is using every effort to make it operate in conformity with the commission's requirements and our engineers have devoted considerable time on the ground to assist them.

The chief operating officer of the Chicago, Milwaukee & St. Paul, under date of April 8, 1925, says:

"Actual mileage of roadside work completed River Jct. to Winona, 22 miles of double track, which covers the test section and will be ready for inspection by the commission as soon as the Union Switch & Signal Company have had an opportunity of making some slight changes in equipment on the locomotives as a result of a preliminary test conducted by them."

Another letter from him dated July 1, 1925, states:

"We have not ordered the additional equipment for the reason that the Union Switch & Signal Company are perfecting what they feel is a more simplified apparatus. This will be ready for inspection about the middle of July, and we desire an opportunity of inspecting the more simplified equipment before equipping the balance of the locomotives."

In addition to this, the New York Central has notified us that it has installed three different devices upon as many divisions of its railroad, that none of them meet the requirements, and that it is compelled to abandon them and find another form of device that will. One of the devices referred to is the continuous-type device of the Union Switch & Signal Company. This information was given to us only a few weeks ago.

The commission, in my opinion, should give due consideration to these and other things before giving approval to this device based upon this short installation of 83.6 miles in length, which has been in operation only since March 31, 1925. What its performance has been since the final inspection April 10, 1925, we are not advised.

In a matter of this kind we should have before us evidence that the device meets, or will meet, the requirements of the commission's order. Approval given before such evidence is furnished may result in great harm and in a real setback to the art of train control. The responsibility incurred by the commission in giving formal approval is not a light one. It, therefore, calls for a thorough and searching analysis of all the facts we have or can obtain with respect to the actual service operation of the device itself. In justice to the carriers that have selected it, to carriers that may be disposed to select it, to the art of train control, and in the interest of the public, approval should be withheld.

I do not intend in this expression to go exhaustively into the large amount of available data we have as to the installation and operation of this device on this road or upon the other 17 roads, hereinafter enumerated, but will point out briefly some of the outstanding facts, which may readily be obtained from those data, which form the bases of my opinion.

The device, in one or the other of the three forms in which it may be furnished, is installed, or is being installed, upon 18 railroads named in the margin. It has been inspected, or observed, in operation by our engineers under varying conditions upon 10 of these roads, and results reported to us.

From these reports it appears that the mechanism is complicated and extremely sensitive. Many important elements in it require a precise and accurate adjustment to be maintained in order that the device as a whole may function properly and continuously. In many instances the elements, for various reasons, some not yet fully understood, frequently get out of proper adjustment in service. Numerous failures and undesirable operations have occurred from this cause, resulting in stops to trains and delays in the operation of the railroad. Because of this, many trips have been made by engines with the automatic train-control device cut out of service. On one road, to cite but one example, 10 trips were made in one week over train-control territory with the device cut out because trouble that had occurred in previous trips had not been located or repaired, or for other causes. There were also in the same week on the same road 15 cases in which the device was cut out of service en route, due to undesired operations or other causes.

Much trouble has been experienced also on several roads through the effects produced in the apparatus by foreign currents or by stray currents. The seriousness of the foreign-current interference arises from the fact that foreign alternating current in the track rails may cause false-clear indications of the train-control device. Some of the trouble due to foreign current has been eliminated through cooperation with power companies, where the trouble has been due to power transmitted by such companies, but on the whole, the problems arising from this cause have not been solved. The carriers have reported few actual false-clear failures but until this trouble is completely eliminated the possibility of false-clear failures will always be present. On one road a complete change from the commercial-current frequency was found to be necessary. Whether this affords the solution for the difficulties arising from interference is not yet known.

Severe electrical storms in a number of instances have so affected the apparatus as to render it inoperative. Serious difficulty arises also from the effects of freezing temperatures. Upon one road during February and March, 1925, there were 38 cases reported where magnet valves were frozen or stuck and several instances where other portions of the apparatus were frozen. On another road the records of troubles encountered in operation in cold weather show that several valves were frozen in service. Any

one of these valves, if frozen in normal position, could cause failures of serious character.

The many objectionable features pointed out in the majority report, the reports of our engineers, and of the carriers which have installed one or the other forms of this device show that its integrity has not been satisfactorily demonstrated, and that the reliability of the device as a whole under everyday operating conditions, under adverse weather conditions, and under ordinary maintenance standards has not been established. Approval should be withheld.

St. Paul to Rebuild Dining Cars

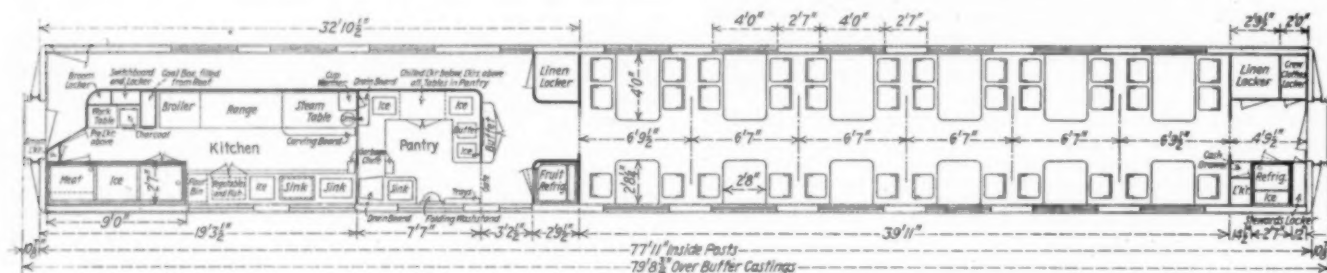
THE Chicago, Milwaukee & St. Paul contemplates rebuilding its wooden dining cars with seating capacity for 30 guests, into 36-seat, steel underframe diners, and the first sample car was recently completed at the railroad company's shops, Milwaukee, Wis.

The rebuilt car is equipped with a steel platform and

nals, and it is, therefore, necessary to take provisions for a 75-hour run. For this reason, an unusually large refrigerator is provided.

It will be noted that the refrigerator compartment near the end of the car has space for meat hooks, so that entire sides of beef can be placed in this compartment. The refrigerator is of the modern type, being iced from the roof. Other features in the kitchen and pantry are indicated on the floor plan.

The usual standard depth underframe is employed. It was necessary to replace the wooden center sills with stringers and bring the steel underframe up close to the floor in order to obtain the usual clearance from top of rail to bottom of center sill. The object of making the sill of standard depth was to obtain an underframe together with the side sill construction of adequate strength to carry the weight of the car body and equipment without maintaining the truss rods originally under the wooden cars. A center sill of less depth than 26 in. in this case



Floor Plan of Rebuilt C. M. & St. P. Diner—Six Additional Seats in the Dining Room and Unusually Large Kitchen Space Are Provided

steel side girders of adequate strength to carry the weight of the car, equipment and passengers without the use of truss rods. The original car was of the ordinary vestibule type and in order to provide two additional tables the end bulkheads of the car were moved out to the buffer beams, eliminating the side doors with the exception of one door at the kitchen end.

The arrangement in the kitchen and pantry is new, as

proved to be unsatisfactory from an engineering standpoint, when buffing stresses and direct loads were considered.

The center sills project $5\frac{1}{4}$ in. above the top surface of the cast steel double body bolster and platform casting. The reason for this offset is to avoid as far as possible, alterations in the present wooden underframe, as with this construction it is only necessary to remove the wooden



C. M. & St. P. Diner Recently Rebuilt at Milwaukee Shops—Steel Underframe Applied—Seating Capacity Increased

additional space had to be provided in order to obtain greater working room, as well as to provide locker space to make the car suitable for Coast line service. The practice on the C. M. & St. P. is to stock dining cars in Coast line trains at Chicago and Tacoma, Wash., the two termi-

center sills at the distance equal to the length of the steel underframe, leaving the platform intact. The platform casting is of the vestibule type, this arrangement permitting the use of a standard underframe construction for both vestibule and blind end cars.

It will be noted that the contour and ceiling decoration is a departure from present practice, inasmuch as practically all molding has been eliminated. The ceiling consists of a three-ply veneer covered on the underside with a heavy burlap, the painting being light cream, stippled. The side finish is plain Cuban mahogany without any inlay or ornamentations.

The chairs are upholstered in black leather to match the carpet, which has a black background with a floral pattern in Chinese red. The side lights are especially designed



The Interior View of the Car Creates an Impression Both of Simplicity and of Beauty

for this car, with parchment shades, hand painted. The ceiling lamps as well as the base of the ceiling fans have special ornamentations to match those on the side fixtures.

From the interior view it will be noted that the buffet is built to a height such as is used in dwellings. This was made to obtain a homelike appearance in the car. In place of the ordinary decksash, it will be noted that shutters in the form of grills are introduced in the upper deck of the car.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended August 15 amounted to 1,064,793 cars, an increase of 111,385 cars as compared with the corresponding week of last year and of 24,855 cars as compared with 1923. This was the third consecutive week in which the loading has exceeded the record figures of the year 1923 and for several weeks it has been above the estimate made earlier in the year by the Car Service Division. Last year's figures were exceeded in all districts and in all classes of commodities except grain and grain products, while the 1923 figures for the corresponding week were exceeded in all districts except the Allegheny and Northwestern. Loading of livestock, coke, forest products and ore was, however, below that for the corresponding week of 1923. Coal loading showed an increase of 45,716 cars as compared with the corresponding week of last year and miscellaneous freight an increase of 33,994 cars, but grain and grain products showed a decrease of 5,751 cars. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

REVENUE FREIGHT CAR LOADING Week Ended August 15, 1925

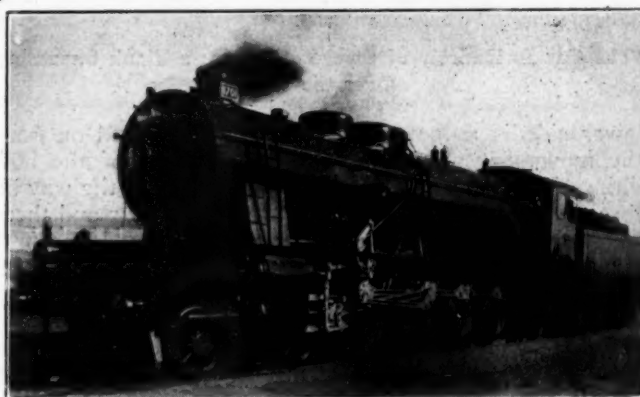
Districts	1925	1924	1923
Eastern	248,738	217,685	248,467
Allegheny	212,339	187,055	224,077
Pocahontas	57,243	43,970	42,434
Southern	149,685	135,320	131,326
Northwestern	165,788	144,101	175,967
Central Western	160,220	157,625	150,890
Southwestern	70,780	67,652	66,777
Total Western	396,788	369,378	393,634
Commodities			
Grain and grain products	54,369	60,120	52,498
Livestock	30,918	30,365	32,551
Coal	190,979	145,263	189,179
Coke	9,782	6,914	13,587
Forest products	71,670	69,553	77,314
Ore	64,794	50,178	80,758
Mdse., l. c. l.	259,210	241,938	241,288
Miscellaneous	383,071	349,077	352,763
Total	1,064,793	953,408	1,039,938
August 8	1,051,611	941,407	973,750
August 1	1,043,063	945,613	1,033,466
July 25	1,029,603	926,309	1,041,415
July 18	1,010,970	930,713	1,029,429
Cumulative total, 33 weeks	31,344,929	29,550,489	30,993,391

The freight car surplus in the first week in August showed a reduction of 25,402 cars, averaging 238,474 cars, including 72,054 coal cars and 126,053 box cars. The Canadian roads for the same week had a surplus of 34,285 cars, including 31,125 box cars. On August 8 there were 42,018 grain box cars stored on roads in the western districts.

Car Loading in Canada

Revenue car loadings at stations in Canada for the week ended August 15, totaled 51,848 cars and showed an increase of 3,523 cars over the previous week. The 1925 crop has not yet started to move in the West and grain loadings fell off 140 cars. Shipments of coal in the East, with the settlement of the strike, showed an improvement of 1,215 cars, and merchandise and miscellaneous freight showed increases. Compared with the same week last year there was an increase of 2,814 cars, improvement being shown of 226 cars in live stock, 507 cars in other forest products, 1,136 cars in merchandise, and 2,271 cars in miscellaneous freight.

Commodities	Total for Canada			Cumulative totals to date	
	Aug. 15, 1925	Aug. 8, 1925	Aug. 16, 1924	1925	1924
Grain and grain products	3,596	3,273	3,782	183,706	249,439
Live stock	2,617	2,506	2,351	72,560	70,865
Coal	3,282	2,051	4,929	108,202	160,226
Coke	225	211	149	8,934	7,471
Lumber	3,741	4,497	3,601	115,202	119,021
Pulpwood	2,017	2,117	1,673	95,653	96,648
Pulp and paper	1,899	1,835	2,015	66,797	65,387
Other forest products	2,482	2,478	1,975	95,545	88,273
Ore	1,630	1,594	1,567	44,195	40,097
Merchandise L.C.L.	16,052	14,245	14,916	492,651	469,406
Miscellaneous	14,307	13,518	12,036	388,397	378,091
Total cars loaded	51,848	48,325	49,034	1,671,842	1,744,924
Total cars received from connections	33,328	32,871	27,758	1,083,974	1,051,718



Kadel & Herbert

A New Spanish Express Passenger Locomotive

Dump Car Embodies New Features

THE increasing appreciation of the value of heavy-duty, all-steel dump cars is indicated by the introduction of a new type of automatic dump car by the Magor Car Corporation, New York. These cars are available in three sizes, known as Types R, B, and C. The Type R cars, which have a capacity of 30 cu. yd., (level full) have a length over the end sills of 38 ft. 2 in. and an over-all width of 10 ft. 1 $\frac{3}{4}$ in. The inside dimensions of the car body are 34 ft. long by 8 ft. 11 $\frac{1}{4}$ in. wide by 2 ft. 8 in. deep. The floor is made of 5/16 in. plates reinforced by a covering of 2 $\frac{3}{4}$ in. planking to absorb the shock of material falling into it as the car is being loaded. The Type B cars are of 20 cu. yd. capacity and the Type C cars of 12 cu. yd. capacity, but the general design is the same as in the large cars.

These cars are dumped by tilting the entire body to either side, with doors that are lifted by a mechanical device as the body is tipped. When desired it is supplied with chutes which normally hang in a vertical position below the sides, but when the car body is tipped the chute or apron on the dumping side swings outward and serves the same purpose as an outward folding door to discharge the load clear of the track and ballast. A particular advantage claimed for the use of the apron operated in this manner is that when the car has been dumped the action of the chute mechanism is such as to withdraw the chute from under the dumped load, thus allowing the car to be righted without having to drag it clear. This allows the work train to move promptly as soon as the loads are dumped.

As the car body is tilted in dumping, the door on the



The Car Is Entirely of Steel Except for a Plank Sheathing Over the Floor

lower side is automatically raised upward and outward, the movement occurring in the early part of the body tilting operation so that the door is well out of the way before the load begins to slide on the tilting floor and thereby guards against shock or strain which would occur if heavy masses in the load were thrown against the door. The clearance between the lifted door and the floor when the body is in the dumping position is 5 ft. 2 in., which is ample to clear practically any rock or other bulky object which would be loaded into the car by a steam shovel.

The doors are of special design, having cast steel end brackets for the attachment of the operating bars. The car bodies are integral units and rest on eight cast steel

supports in which the weight is not carried on pins but the bearing surface of the upper casting rests on hardened steel filler plates, allowing more perfect adjustment and longer life of the bearings.

One feature which has been patented by the maker is a compression lock to prevent the dumping of the body except when required and to maintain the body in a firm position while in transit. This lock is automatically operated when the car body is released but firmly fixed when the car is in an upright position.

In these cars the dumping cylinders are operated by air



In Dumping the Door Raises and the Apron Moves Forward

passing through special operating valves which in turn are operated by selective three-way valves in each air line, which are located under the end platform of the car and controlled by hand rods extending to the outside edge of the platform to permit of control of the car by the operator without risk of accident. Several types of air operation are afforded the purchaser to suit his requirements. These include straight air operation from the locomotive as well as operation through a steel reservoir either in the train or on individual cars.

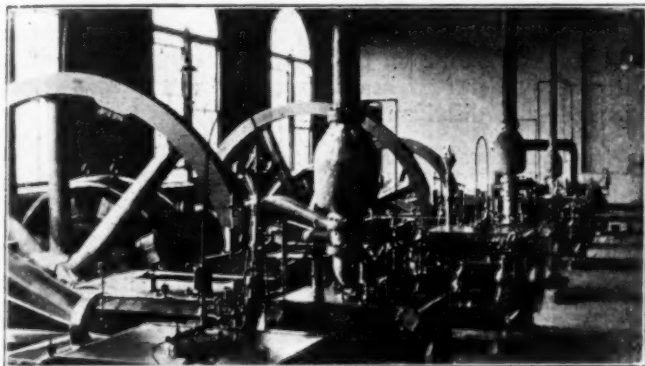


Berlin-Cologne Express Near Hanover Pulled by Two Mikado Type Locomotives

St. Paul Cuts Shop Power Cost \$70,000

Turbine installation at Milwaukee permits shutting down old reciprocating plant and furnishes better service

A REDUCTION of 24 employees and a saving of approximately 700 tons of coal a month, which have been thus far realized as a result of changes made in the power supply at the Milwaukee, Wis., shops of the Chicago, Milwaukee & St. Paul, indicate that an annual saving, in labor and fuel alone, of \$70,000 may be expected. This is in addition to certain intangible savings brought about through having an ample supply of



Some of the Engine Generator Units in the Main Power Plant

power at all times. The turbo-generator unit responsible for this creditable performance has only been in operation since May 1, and was installed to furnish power to the entire plant which includes both locomotive and car shops.

Formerly the electrical power requirements of the shops were met by four 200-k.w. Nordberg-Corliss engine generator units and three 100-k.w. Westinghouse vertical units installed in the so-called main power plant on the locomotive side. In addition a 400-k.w. Vilter-Corliss engine generator unit was installed in a second plant on the car side. These units were installed from time to time to meet the normal increase in demand and represented anything but economical operation. Furthermore, there was always a shortage of power and a shortage of compressed air with the result that the existing units were operated almost continuously at an overload.

2000 K.W. Turbine Handles the Day Load

About a year ago a study was completed and authority granted for modernizing the power plants at these shops. As a result a 2,000-k.w., 2,300-volt, 3-phase Allis-Chalmers turbo-generator unit was purchased for installation in the main power plant. Since the motor equipment throughout the shops was of a direct current type, provision had to be made to convert the alternating current into direct current for distribution. The study indicated that the electrical load center and also the load center of the air supply conformed closely to the power plant on the car department side. It was found after deducting the lighting load that the demand for direct current would be about 1,000 kilowatts with occasional peaks as high as 1,200 to 1,400 kilowatts. It was, therefore, decided to install two 500-k.w. synchronous motor-generator sets in an addition to the existing car department plant building. These have a 25 per cent overload rating for two hours. A 5,000 cu. ft. per min. motor-driven air compressor was also installed in the same building with an

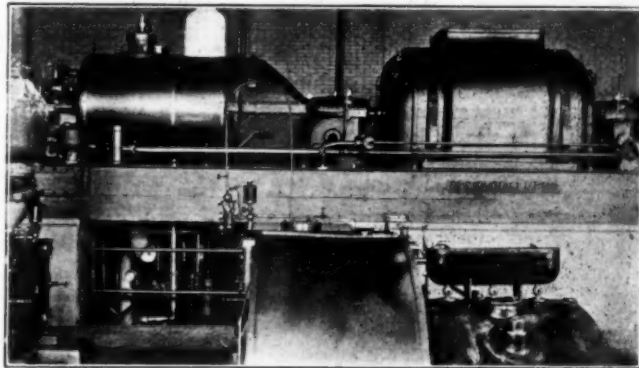
after-cooler and air reservoir in the open, adjacent to the new substation building.

The boiler room in the main plant, which has a capacity of 3,200 b.h.p., is equipped with water tube boilers, stoker fired. The only changes in this boiler room were the addition of individual flow meters and soot blowers.

The 2,000 k.w. turbo unit is of the bleeder type to furnish steam for heating purposes when occasion demands. It is designed to operate condensing saturated steam at a nominal pressure of 140 lb. at the throttle. The unit has a direct-connected exciter on the generator end of the shaft. This unit is installed on an elevated foundation to provide headroom for the condenser, which is of the jet type and installed immediately beneath the turbine. The original layout of the plant included a concrete-lined pool approximately 150 ft. from the end of the power house building. A cooling tower was constructed over this pool for use in conjunction with the condensing arrangement. Experience since the installation was completed shows that a vacuum of 26½ in. can be maintained, even with an outdoor temperature of 90 deg. Fahrenheit. It is believed that by slight alterations to the tower this vacuum can be raised with even the highest summer temperature. No trouble is experienced in maintaining at 28 in. vacuum when the outdoor temperature is as high as 75 deg.

Turbine Operated Only in Day Time

An interesting feature of this installation is the manner of handling the distributing lines. Normally the turbine unit is operated only during the day shift; the



The Turbine Is Installed on an Elevated Foundation to Provide Head Room for the Condenser

demands for electrical power during the remaining two shifts, not being of sufficient amount to warrant operating the turbine. During these shifts the engine-driven units are operated to supply the demand. With this arrangement, and to provide a stand-by service as well, it was necessary that the distribution layout be such as to be supplied from either plant, either independently or working in parallel.

The 3-phase, 2,300-volt power supply is transmitted from the turbo unit in the main plant by a pole line approximately 2,000 ft. in length, connecting the two plants, this line being protected at both ends with choke coils and lightning arresters. On this pole line a direct cur-

rent circuit consisting of two 1,300,000 circular mil cables was installed, connecting the direct current busses of the two plants. This arrangement permits of parallel operation, but the primary source of supply is, of course, from the turbine and motor-generator sets. By placing the motor-generator sets at the load center a large amount of feeder copper has been reclaimed and better voltage regulation provided at the load than was formerly the case.

The switchboard arrangement in the main power house was not disturbed, other than was necessary through the rearrangement of the feeder line. An additional panel was installed separate from the direct current board for control of the turbo unit and transmission line. In the substation, in addition to panels for control of the motor-generator sets, the air compressor and the transmission line, 11 feeder panels, with one feeder per panel, were installed. Formerly in the car department plant a small steam engine-driven generator unit was installed to supply current for battery charging and for testing out lighting in the cars being shopped. This unit was replaced with a small a.c. motor-generator set and control panel which was installed in the new substation.

It is the plan eventually to change all of the lighting throughout the shops at 220 volts, a.c. This has not yet been accomplished but the turbo unit is capable of furnishing an additional 300 kilowatts for this purpose.

Compressed air is furnished for the two shifts when the turbo unit is shut down, by a steam-driven compressor unit in the main power plant. This compressor may also be used to help the large motor-driven compressor in case of an exceptionally heavy demand.

Changes Made Have Improved

the Service Appreciably

The plant has been operating with the new arrangement since approximately May 1, and has already resulted in reducing the payroll by 24 employees and the fuel consumption of the two plants has been reduced by approximately 700 tons a month. The operation up to the present has been entirely in the summer months, but the saving thus far realized indicates that an annual saving in direct labor and fuel of \$70,000 may be expected. The intangible savings through having an ample supply of electric power and compressed air are practically indeterminate, but that they constitute a sizable item cannot be questioned. In the old power plant it was not infrequent to have a voltage of less than 200 at some of the motors, while the air pressure frequently dropped to 65 or 70 lb. With the new plant under average load conditions the voltage at the most isolated motor is not below 215 and no difficulty is experienced in maintaining a pressure of 95 lb. on the air lines. During the winter the saving in labor will not be so great, as the boilers on the car side will have to be operated for heating purposes, requiring one additional fireman per shift. A watchman is also maintained in the car department plant during the night to shut off the air lines when the air is not required and also as a protection against the possible outbreak of fire.

THE COMMISSION has suspended from August 20, until December 18, 1925, the operation of certain schedules as published in Agent F. A. Leland's I. C. C. No. 1759, which propose to cancel through joint rates on live stock from points in Texas to Cincinnati, Ohio, Indianapolis, Ind., Louisville, Ky., and certain other related or intermediate points east of the Mississippi River, and to apply in lieu thereof class or combination rates which would result in increases.

A Four-Year Test of the "19" Train-Order

By Harris C. Cross


Train Dispatcher, St. Louis-Southwestern of Texas, Tyler, Tex.

THIS discussion of the "19" train order system is based on practice and not theory. I am employed as train dispatcher on a southwestern railway that operates about two thousand miles of single track road most of which is not protected by any form of block signals. A new code of rules for the operating department was adopted December 1, 1920, which provided for the substitution of the "19" train-order form for the "31" form. After four years of acid test it has proved without one exception to be absolutely safe. In a few instances the system has proved to be safer than the old system. The advantage in train movement has almost revolutionized train operation on these lines. This subject will be discussed under four heads, namely: theory, practice, advantages and disadvantages.

Theoretical Analysis of Both Forms

Reasonable men have always theorized on a given subject before attempting to execute it. The only difference in the "19" and "31" train order forms that I can see,

Form 248 144 500M NK



CLEARANCE CARD

Station _____ 192 _____

Conductor and Engineer No. _____

Orders For (Form "19" Nos. _____)

Your Train Are (Form "31" Nos. _____)

(If no orders form "19" or "31" endorse "NONE" in space provided for order numbers.)

O. K. at _____ M. _____

Do not leave before _____ M. _____

(Fill in this line only when necessary to comply with Rule 221)

Issued by _____ Opr. at _____ M. _____

Conductors and engineers must each have a copy and see that their train is correctly designated in the above form, also see that the numbers of all train orders received correspond with numbers inserted above.

Operators must retain a carbon copy.

Clearance must be filled out by the operator before repeating train and order numbers to the dispatcher.

After receiving O. K. from the dispatcher no additions must be made, but a new clearance issued.

New Type of Clearance Card

from a theoretical standpoint, is that the "19" form does not require the signatures of the parties addressed while the "31" form does. The number of the form, the color or kind of the paper has no real bearing on the importance of the order. Once it is understood by the train operatives that the "19" train-order form restricts the rights of trains as well as assists them, the importance of the form is quickly established. Theoretically, there is only one reason for retaining the "31" form and that is to prove by the signatures attached to the order that the order was received. There is a better way of doing this than signing an individual order. Train operatives are controlled in the handling of train orders by the use of train-order signals. The rule provides that a train must not pass a train-order signal displayed at "stop" until a clearance card has been received, which permits it to proceed. This rule, thereby makes the clearance card the real proof that a train had the right to proceed. This is the method that we use here to safeguard the movement of trains by the "19" train-order form. We adopted a new type clearance card, shown herewith, which provides that the telegrapher write in the proper space the individual number of each train-order delivered. These numbers are sent to the train dispatcher, and when checked

by the train dispatcher and found to be correct, are "Ok'd" by him, giving his signature and the time. This is the greatest safety-first measure that has been adopted in the handling of trains by train-order. Is it not as easy to prove the receipt of an order by the clearance card as it would be by the signature of the order? As far as theory goes, the "19" system of train orders is as safe as the "31."

Practical Application of the "19" Form

We have safeguarded the "19" system in two ways; first, by the use of the clearance card, as mentioned above, and, second, by substituting the "31" order in certain instances. There are six of these and I will quote them. I would recommend to those desiring to adopt the "19" system that they be incorporated in their book of rules although this is not necessary as special instructions may be issued that will protect just as well. These instructions are executed by the train dispatcher only and really concern no one but him. The six instances are:

(1) If necessary to know positively that the superior train has actually received the order before completing it to the inferior train when it confers right on the inferior train to a point beyond that at which the order is placed for the superior train. (2) Where necessary to restrict a train at a point not a train order office or at one at which the office is closed as per the last paragraph of Rule 217. (3) When reducing a time order. (4) When receipting for a new time-table. (5) When restricting a train that has been cleared or of which the engine has passed the train-order signal. (6) When restricting a work extra when such work extra is within the territory where the order is effective by a rule reading as follows:

"When a '19' form train-order restricting the superiority of a train is issued for it at the point where such superiority is restricted, the train must be brought to a stop before delivery of the order."

Advantages of the "19" Order

As safety always comes first, we will discuss this phase of the subject first. It should be noted that in this discussion the subject is treated in connection with the safeguards that have been thrown around it on the lines mentioned above. It does away with all the danger of an order being covered by train-order carbons taken from other orders after the signatures have been attached. Many train-orders have been signed by conductors that were never delivered on account of the order being lost in a flood of train-order carbons. In handling the "19" form the carbons may be removed after copying and this hazard removed. It permits the telegrapher to fill out his clearance card and attach the orders thereto before the train arrives. It does away with haste, which makes waste and oftentimes accident and hazard. Telegraphers will tell you that the delivery of train-orders after the train has arrived, with the train crews demanding them in haste that they may make the next station on short time, is the most dangerous part of their tour of duty. Having the telegrapher repeat the numbers of all train orders to the train dispatcher for his confirmation removes the hazard of undelivered orders and also of orders that have been annulled and should not be delivered. In using the "19" system the dispatcher can check the numbers of the individual orders on the clearance and in less time than he can run back through his train order book and write the signatures to the "31" forms. Should the above type clearance card be adopted in addition to the "31" system it would seriously overburden the train dispatcher with detail.

The "19" system gives him time to check the clearance card without seriously over-burdening him.

The "19" order system permits the telegraphers at terminals to fix their clearance cards, attach their orders to the card, and deliver them the minute that the conductor reports. This is a great advantage to the third trick

telegrapher and train dispatcher at work train and local time in the morning. I know of a trick where it was necessary to clear 30 local and work trains and all of them were called to leave between 6 a.m. and 7 a.m. It is physically impossible to handle this many trains in that short time when it is necessary to wait until the conductor reports to get his signature to a "31" form. Circumstances like this cause violations of the rule and telegraphers will, in spite of the closest supervision, send the signatures before they have been really signed. The confusion caused by such a swamp of business in so short a period is such a dread to them that they will take a chance on not being caught. It has been winked at by 90 per cent of the division officials in America. The violation of the rule in this instance, and it is universal, does away with the real safeguard of the "31" form. In the use of the "19" form it is possible for the telegrapher to clear these trains early and avoid the confusion. Six to seven o'clock in the morning has lost all of its dread on these lines since the advent of the "19" form and the delays for orders has passed along with it. It does away with all subterfuges.

Delays Occasioned by Train Stops

On this line we operate trains with 30 to 100 cars and it means something for one of these trains to be stopped for orders. Such stoppage consumes not less than 20 min. To avoid this delay train dispatchers have invented train-orders that will permit them to handle inferior trains against superior trains without using the "31" order. The most dangerous practice was to give a superior train leaving a terminal a "wait" that he could not possibly be on and then to decrease this "wait" by using the "19" order. This has also been done by placing the order at stations in advance of the train and then taking it up and placing at another station in advance, continuing this until the train ahead has reached its terminal. This practice is dangerous. Under the "31" form system, it is done and the division officials wink at it for it keeps trains moving. Last but not least, the "19" system **KEEPS TRAINS MOVING**. At the present time on these lines if for some reason a long drag is delayed 10 or 15 min. the dispatcher can give this advantage to every opposing inferior train without detriment to the superior train.

Under the old system it would have cost the superior train more delay than it would have helped the inferior train.

The only disadvantage that I have heard mentioned concerns safety. Experience has taught that the "19" system with the safeguards that surround it removes all hazards.

In conclusion I wish to state that if responsibility should be placed on my shoulders tomorrow to decide whether a given railroad system should adopt the "19" system or not, that I would not hesitate one minute to adopt it. The only real objection that can be raised to the type clearance card herein mentioned is that it divides responsibility. Telegraphers should be taught that they are responsible for the delivery of all orders. The dispatcher should report each failure on the part of the telegrapher to fill out the clearance card but the discipline should be meted out to the telegraphers very lightly. This will permit the dispatcher to report failures without being responsible for the discharge of the party. If discipline is severe the average dispatcher not wishing to be instrumental in causing great trouble to his co-worker shoulders the responsibility and says nothing. The proper handling of this question will go a long way in removing the danger of divided responsibility.

General News Department

The passenger station and freight house of the Denver & Salt Lake at Denver, Colo., was completely destroyed by fire of undetermined origin on August 22. The loss was estimated at \$80,000.

The Illinois Central expects to complete the electrification of its Chicago suburban service and have trains in operation under the new system six months ahead of the time, February 20, 1927, specified in the agreement between the railroad and the city.

As a means of stopping leaks that develop in containers in transit, the Freight Claim division of the American Railway Association suggests the use of soap. It has been found that soap has been used successfully in garages to stop gasoline leaks for it does not dissolve in gasoline or heavier oils, melts very slowly in water, and resists some acids.

Employees of firms in New York which engage in the transportation of baggage and transfer between stations went on strike for higher wages and improved working conditions on August 25. The railroads are, where possible, rerouting baggage to avoid transfer at New York and taxicabs are being largely utilized for the service temporarily.

A movement for the organization of Pullman porters is said to be under way in several localities, particularly in New York. The impetus seems to be coming from outside the service and to be working more or less under cover. Shorter hours, higher wages and pay for overtime and preparation will be demanded when the organization is well organized, it is said.

The engineman and fireman were killed and 14 passengers were injured in a head-on collision between the eastbound and westbound Panoramic specials of the Denver & Rio Grande Western in Granite Canyon, 10 miles west of Buena Vista, Colo., on August 20. It is reported that the cause of the collision was the failure of one train to receive orders to stop at Granite.

Examinations for Safety Appliances and Hours of Service Inspectors

The Civil Service Commission is planning to hold examinations during October for the positions of inspector of safety appliances and inspector of hours of service in the Interstate Commerce Commission. Persons desiring to compete in these examinations may make application in the usual manner. They will be received up to October 10.

Move to End Free Baggage for Non-Passengers

To combat the evil, occasionally encountered, of the passenger who purchases a railway ticket, checks his baggage on it, and then uses a motor bus or a motor car to reach his destination, turning in his ticket for refund, the Southwestern Passenger Association, at a meeting in Denver, Colo., recommended that such refunds be refused unless the ticket, punched to show that baggage has been checked on it, bears also official notification that the baggage in question was withdrawn.

Mississippi-Warrior Line Earning an Operating Net

The net income of the Mississippi-Warrior Service for the five months ended May 31, 1925, after deduction from total revenue of total expenses and depreciation only, was \$180,967.97, compared with a net deficit for the same period last year of \$230,030.84. A total of 568,250 tons of freight were transported in the five months of this year, compared with 486,259 tons in the same period last year. The total revenue this year was \$1,781,398.84, an increase of \$223,168.04 over the total revenue of \$1,558,230.80 in the first five months of last year. Total operating expenses this year were \$1,464,806.26, a reduction of \$151,430.84 under the expenses last year, which were \$1,616,237.10.

Canadian Political Leaders Address Firemen

Premier Mackenzie King, addressing the Dominion legislative board of the Brotherhood of Locomotive Firemen and Enginemen in session in Ottawa last week, declared that the great railway labor organizations should have representation on the board of directors of the Canadian National. The Prime Minister told of steps taken previously to insure labor a voice in the government of Canada and in the direction of the Canadian railways. He referred to the selection, when the federal Cabinet was formed four years ago, of James Murdock as Minister of Labor. He had risen from the ranks and been an official of one of the great railway organizations.

Arthur Meighen, leader of the federal Conservatives, also addressed the railway men and told them he believed in labor unions but he said he was not sure whether he favored international unions or not. He emphasized the fact that the first duty of every Canadian citizen was to Canada. "Do not let your fidelity to your great organization lead you to forget that," he added.

Premier King stressed the importance of justice as between the parties to industry. If one of those parties assumed or tried to assume complete control failure was bound to ensue. He referred to the pension rights of the Grand Trunk Railway employees who took part in the 1911 strike, claiming that the first act of his government was to have the men who had been deprived of pensions reinstated. Mayor Balharrie of Ottawa and P. C. Larkin, Canadian High Commissioner in London, who was in Ottawa for a few days, also spoke words of welcome to the railway men.

The Kind of Radio the Railroads Need

I. C. Forshee, telegraph and telephone engineer of the Pennsylvania in an address before the national convention of the Radio Relay League at Chicago outlined the radio devices which, if developed, could be used in quantity by the railroads.

Pointing out the need of better communication between the engine and caboose of long freight trains, especially during storms or foggy weather, Mr. Forshee said there was an immediate demand for "a two way service that is reliable under all conditions, economical to install, maintain and operate, rugged to withstand the service conditions and relatively simple to operate."

"Small portable radio sets that could be used to bridge the gaps caused by storms or washouts and operate reliably over distances up to, say, five miles, would be considered favorably by railroad superintendents of telegraph," he added. "They would have to be rugged, economical, and also relatively simple to operate and maintain."

The installation of radio receiving sets on passenger trains has been experimented with on various railroads, Mr. Forshee said, but as a general thing they have not been retained as regular equipment.

"The apparatus available now would make it possible to furnish this service, if there were a real demand for it, in a more satisfactory manner than heretofore. The likes and dislikes of the traveling public are variable quantities and that also applies to radio entertainment," he said.

"There are certain conditions that exist on and along a railroad that are appreciably different than at home, such as axle generators and fan motors on the cars, head light generators on the engines, power lines along the route with occasional defective insulators, tunnels in which the reception is practically dead, deep cuts, steel bridges and buildings that reduce the volume of reception in varying degrees, and the curvature of the track which affects the reception where the antenna has any directional effect.

"For these reasons, together with the cost to operate and maintain, the railroads, generally, have refrained from making this a part of their regular train equipment."

Mr. Forshee expressed the thanks of the railroads in general and the Pennsylvania System in particular for the assistance

given by the league in transmitting messages in tests and under conditions when ordinary wire communications had been temporarily suspended on account of breaks. An arrangement for handling messages for the Pennsylvania through amateur operators of the league has been in effect along the Pennsylvania lines for about two years.

Pledge Support Against Highway Competition

The chambers of commerce and similar organizations of 77 towns along the lines of the St. Louis-San Francisco have signed resolutions pledging support to the railway in its competition with motor bus and truck lines. The towns, the largest of which is Springfield, Mo., are located in Missouri, Arkansas, Oklahoma, Mississippi, Alabama, and Kansas. The resolution states:

"Whereas, we realize that the railroads are now, and have been, one of the greatest factors in the development of the country in that they have spent millions of dollars in building and maintaining road bed, equipment and other facilities, in the handling of their affairs, thus furnishing employment to many persons living in the communities through which they operate; also realizing that they cannot maintain local service at a loss, and further, that without railroad service we would not be able to induce new industries to locate here; therefore, be it resolved, that all business concerns and members of this organization be requested to use the railroad service wherever possible in transporting freight, either long or short haul; and be it further resolved that the members of this organization use their influence in getting all persons with whom they come in contact to ride the railroad trains, also to use the express and baggage service furnished by such trains, thus helping to maintain the service we now have and, if possible, make it necessary that other trains be added to handle the business originating along the line."

The resolutions were prepared by the general chairman of the Order of Railway Telegraphers on the Frisco and were circulated by members of that organization. Commenting on the resolutions, President J. M. Kurn of the Frisco, said that such support would be very welcome, but that it had not been solicited by the company.

Master Blacksmiths' Supply Men's

Association Elect Officers for 1926

A total of thirteen railway supply companies had exhibits of their products at the twenty-ninth annual convention of the International Railroad Master Blacksmiths' Association, held August 18, 19 and 20, at Cleveland, Ohio. The annual meeting of the Supply Men's Association was held at the Hotel Winton, August 20, at which time the following officers were elected: James A. Murray, Ajax Manufacturing Company, president; A. N. Lucas, the Oxweld Railroad Service Company, vice-president, and Edwin T. Jackman, Firth-Sterling Company, secretary-treasurer. The following is a list of the exhibitors with their representatives:

Ajax Manufacturing Company, Cleveland, Ohio.—Forgings, model of board drop hammer, model of 4-in. Ajax upsetting forging machine, and literature. Represented by J. R. Blakeslee, J. A. Murray, A. L. Guilford, G. Fistoe and W. W. Criley.
Anti-Borax Compound Company, Ft. Wayne, Ind.—Welding compound and literature. Represented by Charles O. Kahre.
Colonial Steel Company, Pittsburgh, Pa.—Crucible for melting steel, specimens of hardened fractures, raw alloy material used in making high-speed steel, specimens of alloy and carbon tool steel fractures, and literature. Represented by F. L. Stevenson.
Crucible Steel Company of America, Pittsburgh, Pa.—Forging machine gripper dies, taps, high-speed steel and Sanderson special tool steel. Represented by F. Baskerville, A. E. Jones and W. M. Stevenson.
Firth-Sterling Steel Company, McKeesport, Pa.—C. Y. W. bolt and rivet dies, special rivet buster. Represented by Edwin T. Jackman, Willard C. Royce, Thomas A. Larecey, and William A. Nungester.
E. F. Houghton & Co., Philadelphia, Pa.—Railway springs, quenching oils, "draw-temp," hydrocarbonate base black, "quick light A," literature. Represented by Wilbur Wrigley, W. A. Fletcher and J. E. Burns, Jr.
Metal & Thermit Corporation, New York.—Specimens of thermit welding, literature. Represented by Henry D. Kelly and W. H. Moore.
National Machinery Company, Tiffin, Ohio.—Literature. Represented by E. R. Frost, Karl L. Ernst, H. E. Lott and F. J. Mawey.
Oxweld Railroad Service Company, Chicago.—Gas cylinder gages and torches. Represented by William A. Champieux, A. N. Lucas, William Jones, J. W. Boyd and J. W. O'Neil.
Pilot Packing Company, Chicago.—Packing. Literature. Represented by W. W. Bacon.
Railway Journal, Chicago.—Copies of publication. Represented by E. C. Cook.
Railway Mechanical Engineer, New York.—Copies of publication. Represented by Marion B. Richardson.
Rockwell, W. S., Company, New York.—High and low pressure burners and blast gates, fuel oil appliances, forging and heat treating furnaces, literature. Represented by C. P. Cogswell, D. M. Powers and R. M. Atwater.
Ulster Iron Works, Dover, N. J.—Special staybolt iron, engine bolt iron, drilled hollow staybolts, hammered iron billets. Represented by C. F. Barton, E. W. Kavanaugh, J. C. Campbell and L. E. Hasman.

Traffic News

The North-Pacific regional advisory board for the states of Washington, Oregon, and part of Idaho and British Columbia was organized on August 27 at Portland, Ore.

During the week of August 17 the California Railroad Commission held hearings on 25 applications for permission to operate truck freight lines near Los Angeles, Cal., for the transportation of milk and agricultural produce.

The Texas Industrial Traffic League is planning to ask for a continuance at Dallas, Tex., of the hearing before the Interstate Commerce Commission for a general increase in freight rates to be heard at Chicago on September 8.

The Mexican Confederated Chambers of Commerce have petitioned the National Railways of Mexico to reduce fares to traveling salesmen in order to encourage trade in Mexico and to permit them to carry 70 kilos (155 lbs.) of baggage free.

The Illinois Central and the Central of Georgia have filed a supplemental petition with the Interstate Commerce Commission for authority for the Ocean Steamship Company to extend its operations by a water line between Savannah, Ga., and Miami, Fla.

Increased rates on fruit and vegetables between California and Oregon and points in Washington to be put into effect by the Southern Pacific were suspended by the Interstate Commerce Commission until November 6, pending a decision by the commission.

The New York, New Haven & Hartford has received permission from the Massachusetts Department of Public Works to operate motor buses between Fall River, Mass., and Providence, R. I., and through points in Massachusetts on routes between Newport, R. I., and Providence.

Proposed new schedules cancelling through joint rates on livestock from Texas points to Cincinnati, Ohio, Indianapolis, Ind., Louisville, Ky., and certain other related points east of the Mississippi were ordered suspended by the Interstate Commerce Commission, from August 20 to December 18.

During the cantaloupe season of the Imperial Valley of California just closed, the Southern Pacific handled 96.6 per cent of a total of 14,500 cars of fruit without delay on a schedule of 75 hr. between Brawley, Cal., and Tucumcari, N. M. The maximum number of cars handled on one day was 615.

Embargoes on dead freight are in effect to certain points on the east coast of Florida where the boom in building is at its height. These have been made necessary by the extreme congestion of traffic—largely building materials which are being shipped in to meet the demands of the rapidly growing communities.

The annual convention of the National Council of Traveling Salesmen's Association which will be held in New York on September 1, 2 and 3, will consider steps to be taken in an attempt to force the elimination of the surcharge for Pullman tickets. Legal measures to force the elimination are under consideration and will come up for decision at the convention.

The Canadian National and the Canadian Pacific attained the peak of harvest passenger traffic for the season during the period from August 15 to August 17. On August 15 and 16 three special trains were operated by each of these roads, carrying 4,422 harvest workers from eastern Canada points to Regina, Sask. On August 17 six special trains carried 5,000 more passengers.

The New Hampshire Public Service Commission has authorized the Boston & Maine Transportation Company to operate buses between the Boston & Maine station in Franklin or Franklin Falls to Bridgewater via Hill and Bristol (about 15 miles). This route parallels a branch of the Boston & Maine except from Bristol to Bridgewater, where no service is now given by a common carrier. The bus line is, therefore, in effect, a substitute

for and an extension of a railroad branch line. Service on the branch line will be curtailed.

The Illinois Central will operate a 20-hour train from Chicago to Gulfport, Miss., and return on October 16 in connection with the "Motorcade" which will be operated by the National Motorists' Association on October 12, from Chicago to Gulfport to advertise the Mississippi Gulf coast. The train will leave Chicago on October 16 and will return from Gulfport at noon on the following Monday.

The total loss and damage for the first five months of 1925 as reported by the principal carriers of the United States to the Freight Claim division of the American Railway Association, totalled \$17,093,665 as compared with \$22,431,159 for the same period in 1924, a reduction of 23.8 per cent. For the month of May, 1925, the amount totalled \$3,289,290 as compared with \$4,282,299 in May, 1924, or a decrease of 23.2 per cent.

The carlot movement of American commodities into Mexico through the port of Laredo, Tex., during the month of July, 1925, totalled 571 carloads for industries in Mexico, and 38 carloads of material for the National Railways of Mexico, making a total of 609. The shipments included 83 carloads of automobiles, 15 of brick, 35 of cattle, 16 of eggs, 11 of fuel oil, 55 of lard, 72 of lumber, 19 of machinery, 31 of sand, 10 of soda ash, 19 of vegetable oils, 18 of wheat and 10 of wire.

The Farmers' Grain Dealers' Association of North Dakota, and the North Dakota Farm Bureau Federation have filed complaints with the Interstate Commerce Commission against the Great Northern, the Northern Pacific, the Chicago, Milwaukee & St. Paul and other northwest roads, alleging that present rates on grain and grain products from points in North Dakota to Duluth, Minn., and the Twin Cities are unjust and have asked that the roads be ordered to establish lower rates.

The Atchison, Topeka & Santa Fe has applied to the Public Service Commission of Kansas for permission to designate certain specified towns as prepay stations to which no shipments can be consigned collect. The petition points out that part-time agents in small towns are not fully acquainted with the railroad's accounting methods and are frequently unable to make proper collections. The new method will obviate the necessity of these resident agents making collections and keeping accounts.

The Oregon-Washington Railroad & Navigation Company replaced its passenger trains with auto buses between Walla Walla, Wash., and Pendleton, Ore., on August 20 as an experiment to determine the practicability of their operation on other parts of the system. Tickets are interchangeable between the auto buses and steam trains. As a result of the road's entry into the auto bus field, a competing line changed its leaving time from Pendleton and Walla Walla so that its buses leave 30 min. ahead of the railroad company's buses.

The Chicago & Eastern Illinois will place in service on September 6 the Dixie Express, a new train supplementing the Dixie Flyer, which becomes an all-Pullman train on the same date. The Dixie Express will leave Chicago at 9:45 p. m., carrying Pullman equipment to Atlanta, Ga., and Jacksonville, Fla., as well as coaches to Jacksonville. The Dixie Flyer, which leaves Chicago at the same time, will carry all Pullman equipment for Miami, Fla., St. Petersburg and Tampa. A third Florida train, the Dixie Limited, which will leave Chicago in the morning, will be placed in service in November.

Boston & Maine to Try to Make

Newburyport Branch Pay Its Way

An effort will be made to save the Newburyport branch of the Boston & Maine by instituting "extraordinary operating economies." The step is taken at the request of the Department of Public Utilities of Massachusetts and calls for reduction in train service, closing of some stations and cutting down costs of crossing protection. While this plan is being tried, the Boston & Maine agrees to a suspension of the proceedings for abandonment of the line which are now pending before the Interstate Commerce Commission.

The plan is termed a "final experiment to find out whether the branch can be saved through extraordinary operating economies

which are possible only through co-operation on the part of the communities." The railroad's statement recalls the fact that losses on this branch amount to over \$100,000 a year, and that representatives of the towns along the line who appeared at the recent hearings before Interstate Commerce Commissioner Meyer "indicated a willingness to accept curtailments of service and to assist in other directions—some suggesting higher rates—if by such means operation of the branch could be continued."

"Details of the new service are being worked out with a view to meeting the requirements of the largest possible number of residents along the branch," the statement says, but no further reference is made to increased fares. The changes are not expected to be effective until the regular fall timetable change late in September.

The Newburyport branch is one of the group of unprofitable branch lines in Massachusetts and New Hampshire, aggregating 180 miles, on which the Boston & Maine has asked authority for discontinuance on the ground that the losses of approximately \$536,000 a year constitute an unwarranted burden on the rest of the system. The first of these lines on which authority was granted was the Nashua & Acton Railroad, which is now being dismantled.

Santa Fe Offers Extensive Motor Trips

The Atchison, Topeka & Santa Fe next spring will establish a 300-mile bus trip through the Indo-Spanish southwest for trans-continental tourists who may desire a three-day trip over the route as a part of the regular trip to the coast. This company also will operate a regular bus line from Las Vegas, N. Mex., to Albuquerque, including a side trip to Old Santa Fe, the Indian Pueblo, Tesuque, Santa Clara, San Juan, and other points.

The Crescent Limited in Oil

The accompanying illustration is reproduced from a photograph made of an oil painting of the Crescent Limited which was put into daily service between New Orleans and New York on April 26.

Special equipment was acquired for use on this schedule and five complete trains are required to maintain it. Valet and maid



The Crescent Limited

service and other refinements such as are customary on de luxe trains are provided. The train operates over the Pennsylvania, the Southern, the Atlanta & West Point and the Louisville & Nashville. It leaves New York at 6:40 p. m. westbound and arrives in New Orleans at 9:15 a. m. the second day. Eastbound it leaves New Orleans at 10 p. m. and arrives at New York at 11:50 a. m. the second day. Thirty-five new Pullman cars were

built for this service and these cars are named after famous men nominated, five each, by the governors of Alabama, Mississippi, Georgia, Louisiana, North Carolina, South Carolina and Virginia. These names include such illustrious ones as John Marshall, Francis Marion, Stonewall Jackson, Patrick Henry, Joel Chandler Harris and General Beauregard.

Freight Traffic for Six Months

Freight traffic during the first six months of this year amounted to 212,509,796,000 net ton miles, according to reports filed by the carriers with the Bureau of Railway Economics. This was an increase of 7,782,890,000 net ton miles or 3.8 per cent as compared with the corresponding period last year but a decrease of 12,974,000,000 net ton miles or 5.8 per cent as compared with the corresponding period in 1923, when the volume of freight, measured in net ton miles, was the greatest on record for any corresponding period.

Freight traffic in the Eastern district for the six months showed an increase of 3.6 per cent over that of the corresponding period last year but a decrease of 9.1 per cent under that of the corresponding period in 1923. The Southern district showed an increase of 6.0 per cent over 1924 but a decrease of 2.0 per cent under 1923, while in the Western district there was an increase of 3.2 per cent compared with the first six months last year but a decrease of 2.2 per cent compared with the same period in 1923.

For the month of June alone, freight traffic on the Class I railroads amounted to 35,863,078,000 net ton miles, an increase of 3,895,580,000 net ton miles or 12.2 per cent over that of June last year but a decrease of 2,137,523,000 net ton miles or 5.6 per cent compared with 1923. The Eastern district showed an increase in June of 13.2 per cent compared with June a year ago, while the Southern district showed an increase of 16.8 per cent and the Western district an increase of 9.1 per cent.

The daily average movement per freight car in June was 27.4 miles, an increase of 2.3 miles compared with June last year but a decrease of nine-tenths of a mile compared with June two years ago. The average daily movement per freight car in June was an increase of one-tenth of a mile compared with May, this year.

The average load per freight car in June was 26.9 tons, the same as that for May, but one-fifth of a ton greater than that for June last year. Compared with two years ago, the average for June this year was a decrease of 1.3 tons.

More Canadians Seek Rate Reductions

A large number of eleventh hour complaints of unjust discrimination in the matter of railway freight rates were made to the Dominion Railway Board at Ottawa. The Board had announced that August 15 would be the last date upon which it would receive submissions from individual or organized shippers throughout the Dominion before attempting the work of equalizing rates. Many submissions came in on the last day and two or three after the date named, notably from the governments of Alberta and Saskatchewan. The latter complained that rates are higher in Western Canada than in Eastern Canada, and that they should be brought to a parity with Eastern rates. Both governments protest against the difference in rates on grain moving eastward under the Crow's Nest Pass arrangement and grain moving westward to Vancouver.

The City of Winnipeg and the Winnipeg Board of Trade in a joint submission declare that the class rates in effect from Eastern Canada are unjustly discriminatory and give to Eastern Canada undue preference on shipments moving under class rates in competition with shipments from Eastern Canada to Winnipeg and reshipped from Winnipeg to the same points in Western Canada. More favorable rates on dairy and other farm products, so as to permit Manitoba producers to compete with producers in Eastern Canada, are also asked.

A readjustment downwards of freight rates on pulpwood and wood pulp is asked by the Canadian Pulp and Paper Association, which submits that the present rates on these commodities are now excessive. The Dominion Sugar Company of Montreal urges that just and reasonable rates be granted on shipments of sugar beets to its Chatham and Wallaceburg, Ont., plants. Relief from alleged excessive rates on ground wood pulp to New

England and Northern New York regions is asked by the Northern Ontario Light & Power Company, while the Northern Canning Company, supported in its request by the New Liskeard Board of Trade (in the Cobalt region), seeks commodity rates on canned goods from New Liskeard to Montreal and other Eastern points, similar to those enjoyed by competitors in southern Ontario.

The Railway Board, it is expected, will in a few days after making a survey of the representations made to it from various parts of Canada map an itinerary which it will commence in a few weeks when it will get down to business in the matter of ironing out the inequalities in freight rates.

Suggestions as to Grain Movement

Grain loading to date has progressed satisfactorily with little strain on the box car supply of the country, according to a letter addressed to the railroad by L. M. Betts, manager of the closed car section of the Car Service Division, A. R. A. Winter wheat movement has been considerably below last year, due both to a smaller crop and to more moderate marketing.

"It seems reasonably certain that similar conditions will not prevail in the spring wheat movement from the Northwestern states now getting under way," Mr. Betts says. "The crop will be smaller than last year but the reduction is comparatively much less than in the case of winter wheat. With wheat this year on practically a domestic basis, little export demand has developed or is expected. Instead of a short local movement in the Northwest to lake ports for shipment by water as occurred last year, it is expected that spring wheat, because of milling demand, will be shipped all-rail to all parts of the country, especially to Eastern and Southern destinations. This will not only greatly lengthen the average haul, requiring more cars, but obviously will scatter the cars of Northwestern carriers to other roads, East, South and West.

"These conditions applying to wheat, plus a heavy movement of oats, with a large crop of corn to handle a little later, and general traffic on a heavy scale, give decided point to the necessity for continuing an effective distribution of box cars to meet the country's demands.

The following specific suggestions are made to roads in the East and South:

(1) Keep the number of Western ownership box cars on line down to the minimum, and not in excess of recent levels even in the face of heavier traffic from Western roads.

(2) Prohibit the loading of Western box cars with any freight if necessary to secure above results. In no case permit loading of such cars out of home route.

(3) Traffic in box cars loaded to Western territory, to the greatest practicable extent, should be in equipment suitable for a return load of grain or flour.

(4) Give best possible delivery on orders from Western roads for protection of grain and flour loading.

(5) See that East- and Southbound loading of grain and mill products from border terminal markets (such as Chicago, Peoria, St. Louis, etc.) is protected with Eastern and Southern cars, permitting Western cars released with inbound loads to move promptly back to the country.

Suggestions applying particularly to Western roads:

(1) Give special attention to the prompt return to owners of cars belonging to the heavy grain loading roads of the Northwest: G. N., Soo Line, C. St. P. M. & O., M. & St. L., N. P., C. M. & St. P., C. & N. W., C. G. W.

(2) Secure prompt release of cars destined Western grain markets, do not permit reloading away from home and hurry return to owners.

(3) Roads serving flour mills must release cars belonging to originating grain loading roads and protect outgoing shipments with other cars, preferably those belonging to destination roads; if necessary calling on Eastern and Southern roads for assistance.

(4) Order cars furnished by Eastern and Southern roads should be loaded back to owners and not merely to home territory.

(5) Observe rigidly the so-called "Junction Rule."

"Owing to lighter grain movement in certain States, some Western roads may have system cars to spare that are actual or potential grain cars. Such equipment will be needed and should be reported to loading lines or to this office for distribution."

Foreign Railway News

Mexican Roads to Operate Own Sleeping Cars

According to advice from Mexico City, the National Railways of Mexico have purchased all sleeping car equipment which has been operating in Mexico and will in the future have charge of all such service within the republic.

Russia Plans to Extend Chinese Eastern to Meet Prospective Competition

Russia is believed to be negotiating with China for the construction of a line of railway from Tsitsihar to Kaiho and for converting the Aganchi-Tsitsihar branch to Russian broad gage, according to a cable dispatch from Tokyo to the Christian Science Monitor. The purpose of the new line and the gage change would be to offset the gains of the South Manchurian Railway by the construction of its Taonan-Tsitsihar branch.

Calles Orders Holding Down Railway Budget

President Calles has given final and definite instructions that the National Railways budget shall not exceed 78,000,000 pesos yearly, which is to include all salaries, fuel costs, new construction, repairs, etc. The President has furthermore advised that he will be agreeable to any plan which the United Federation of Syndicates may see fit to propose, provided that the expense comes within the fixed limit. The Director General of the Railways stated that in case the labor element does not immediately make adjustments necessary, that the government will be forced to make them.

Danish State Railways Reduce Rates

A number of reductions in the carrying charges of Danish State Railways were scheduled to become effective July 1, according to Commerce Reports. These reductions are brought about by the increasing competition of motor truck transportation.

The cuts will range from 33 to 45 per cent and will cover mainly the rates on small packages. The rates on perishable articles, which are given express service, also will be lowered.

In connection with these reductions the Danish State Railways have also announced that the present low charges for carrying used and empty containers will apply only to such containers as have been originally carried filled by the Danish State railways, and shippers of empty containers must show the original filled-container shipment invoice in order to secure the low rates.

Direct Freight Shipments Between

Germany and Russia

While direct freight shipments between Russia and Germany have, in principle, been in effect since the end of the war, there have been a great many practical difficulties connected with the exchange of goods between the two countries, according to Commerce Reports. Gages on Russian and German railroads are not uniform, making it necessary to reload all goods at the border. This has caused considerable waste of time as well as damage of goods.

To overcome this and other difficulties, the German and Russian governments concluded an agreement, effective July 15, 1925, concerning the handling of freight between the two countries. The agreement was officially contracted by the Federal German Railroad Company (Deutsch Reichsbahngesellschaft) and the railroads of the Union of Socialist Soviet Republics. The Russian railroads also have made special arrangements with those of Latvia, Lithuania, and Esthonia, providing for the transshipment of Russian and German goods through those countries.

As it was impossible to reconstruct gages on Russian and German railroads on a uniform basis, an arrangement has been made whereby the entire bodies of freight cars are to be lifted from their trucks at the frontier and placed on the trucks of the railroads over which they are to continue. This will eliminate repacking and reloading.

The new agreement provides, further, for reduced freight rates on commodities shipped directly between Germany and Russia. Reductions granted by the German Railroad Company amount to about 30 per cent of the regular rates and, in the case of some commodities, to as much as 50 per cent. As a whole, Russian railroads have reduced rates on shipments to Germany by about 10 per cent, but in some instances reductions are as great as 30 per cent.

Russian-Polish Through-Traffic Agreement

A railway agreement between Poland and Russia was signed in Warsaw on April 24, 1925, and has since been ratified, according to Commerce Reports. Under this agreement through passenger and freight traffic is established via the following Polish frontier stations along the border from the north to the south: Zahacie (on the line between Vilna and Polotsk), Stolpce (on the line between Brest Litovsk and Minsk), Miklaszewice (on the line between Pinsk and Gomel), Zdobunowo (on the line between Brest Litovsk and Kief), and Podwoloczyska (on the line between Lwow and Odessa). The corresponding Russian frontier stations are Farinovo, Negoreloye, Zhytkovitchi, Shepetovka and Volotchysk. Traffic may be directed through other stations by special arrangement.

Through freight traffic will be possible from and to all stations of both countries, but through passenger traffic only from and to the stations named by the railway conferences which shall be called from time to time by parties to the agreement. The movement of trains between the frontier stations will be arranged by both parties in accordance with the through international schedules, as well as with the necessities of postal communication and the amount of traffic.

Special frontier agreements will have to be concluded dealing with the ways and means of transshipping, use of telephones and telegraphs, use of buildings and equipment, etc. Customs and passport inspections will be made by the parties concerned at their own stations.

Passengers, luggage, and railway parcels are carried subject to special arrangements. Freight is carried subject to the stipulations of the Berne International Convention of December 22, 1908, but with such changes as are provided for in the present agreement.

Through rates are in effect between Poland and Russia, but if no such rate is on file the rate charged will be the total of the Polish and the Russian local tariffs.

A conference must be held between the signatory parties at least once a year, with the view to further improvement and development of the through traffic made possible by the present agreement. Special conferences may be called at the demand of one of the parties. All disputes arising out of the present agreement shall be decided either at the conferences or by an arbitration court composed of one arbiter from each side, who will elect an umpire.



Heaviest Mikado Locomotive in Germany Handling Cologne-Berlin Passenger Train Near Hanover Station

Equipment and Supplies

Locomotives

THE ALTON & SOUTHERN has ordered one Mikado type locomotive from the American Locomotive Company.

THE SOUTH AFRICAN RAILWAYS & HARBOURS have ordered 5 Pacific type locomotives and 10 Mountain type locomotives from the Baldwin Locomotive Works.

Freight Cars

THE NEW YORK CENTRAL is asking for prices on 1,000 hopper cars of 70 tons' capacity.

THE CHINESE GOVERNMENT RAILWAYS are inquiring through the car-builders for 15 freight cars.

THE SIERRA RAILWAY OF CALIFORNIA is inquiring for 60 steel hopper cars of about 50 tons' capacity.

THE SOUTH AFRICAN RAILWAY & HARBOURS are inquiring through the car builders for 75 bogie fruit wagons.

THE LEHIGH & NEW ENGLAND has given contract to the American Car & Foundry Company for extensive repairs to 300 hopper coal cars.

THE WARNER SUGAR COMPANY has ordered 75 cane cars from the Magor Car Corporation. Inquiry for this equipment was reported in the *Railway Age* of August 15.

THE KING CHEMICAL COMPANY, New York, has ordered from the General American Tank Car Corporation, one tank car of 20 tons' capacity, for carrying sulphur dioxide.

THE HAVANA CENTRAL, reported in the *Railway Age* of August 22 as contemplating the purchase of about 200 box cars, is now inquiring for 250 box cars and 145 flat cars of 30 tons' capacity; this equipment is for service on the United Railways of Havana.

THE MID-CONTINENT PETROLEUM CORPORATION has ordered from the American Car & Foundry Company 5, 40-ton, 6,000 gal. two compartment tank cars and 3, 40-ton, 8,000 gal. three compartment tank cars.

CHICAGO & NORTH WESTERN.—Recommendations have been made by the traffic and mechanical departments to the president for the purchase of a number of box cars, automobile cars, stock cars, flat cars, refrigerator cars, gondola cars, and passenger cars. Inquiries will be issued upon the approval of the president. This company is now inquiring for 25 steel underframes for caboose cars.

Passenger Cars

THE UNION PACIFIC is inquiring for one or two business cars.

THE FLORIDA EAST COAST has bought from the Pullman Company 20 Pullman sleeping cars rebuilt as passenger coaches.

LA PROVINCIA, BUENOS AIRES RAILROAD COMPANY is inquiring through the carbuilders for prices on specialties for 10 sleeping cars.

Iron and Steel

THE ERIE is inquiring for 200 tons of steel for bridges.

THE SOUTHERN PACIFIC is inquiring for 300 tons of structural steel.

THE ATCHISON, TOPEKA & SANTA FE is inquiring for 200 tons of structural steel.

THE BALTIMORE & OHIO is inquiring for 200 tons of steel for bridges at Akron, Ohio.

THE DELAWARE, LACKAWANNA & WESTERN is inquiring for 300 tons of steel for a bridge.

THE BALTIMORE & OHIO has ordered 1,500 tons of rail from the Carnegie Steel Company.

THE WHEELING & LAKE ERIE has ordered 1,000 tons of rail from the Carnegie Steel Company.

THE SOUTHERN RAILWAY has placed an order for 1,400 tons of bridge steel with the Virginia Bridge & Iron Company.

THE LEHIGH & NEW ENGLAND has ordered 500 tons of 100-lb. A. R. A. "B" rail, from the Bethlehem Steel Company.

THE UNION PACIFIC has ordered 178 tons of structural steel for use at Montebello, Cal., from the American Bridge Company.

THE PENNSYLVANIA has ordered 600 tons of steel for a bridge over the Schuylkill river from the Fort Pitt Bridge Company and 605 tons for a bridge at Lehigh avenue, Philadelphia, from the Bethlehem Steel Company.

Machinery and Tools

THE WABASH is inquiring for one 20-ton locomotive crane.

THE BOSTON & MAINE has ordered three 25-ton locomotive cranes from the Industrial Works.

THE BOSTON & MAINE has ordered one ditcher from the American Hoist & Derrick Company.

THE ATLANTIC COAST LINE has ordered a 5-ton, 66-ft. span traveling crane, from the Niles-Bement-Pond Company.

FREIGHT CARS ORDERED, INSTALLED AND RETIRED

Month—1924	Domestic orders reported during month	Installed during month	Aggregate capacity tons	Retired during month	Aggregate capacity tons	Owned at end of month	Aggregate capacity tons	On order as of first of following month	Building in R. R. shops
July	533	16,583	1,151,302	8,413	316,927	2,322,968	102,388,652	51,156	4,602
August	4,751	15,452	785,288	8,834	333,173	2,329,582	102,845,000	40,961	3,618
September	22,520	15,455	779,078	9,337	370,607	2,336,147	103,270,000	47,553	3,045
October	11,853	16,598	834,762	10,504	*418,816	2,342,149	103,688,000	38,403	3,574
November	13,038	11,705	579,234	10,678	463,970	2,342,479	103,767,000	42,765	5,159
December	9,526	6,763	311,254	11,918	488,035	2,337,229	103,585,000	54,202	6,478
January, 1925	10,312	11,768	551,263	7,867	326,812	2,341,109	103,812,974	58,910	5,285
February	5,388	15,024	721,867	9,453	365,111	2,346,687	104,169,525	50,603	4,878
March	4,677	16,007	753,947	12,067	474,644	2,350,697	104,454,128	45,419	5,572
April	5,525	13,749	652,462	10,497	423,322	2,353,956	104,683,798	42,602	8,072
May	8,944	12,982	612,607	8,658	335,401	2,356,641	104,902,235	35,823	9,042
June	777	12,191	590,657	9,797	365,589	2,359,040	105,127,861	27,458	8,633
July	843								
Total for 6 months		81,721							
Total for 7 months	36,466								

*Corrected figure.

Details as to orders from *Railway Age* weekly reports. Figures include all domestic orders placed with builders and railroad shops but not rebuilt equipment.

Figures as to installations and retirements prepared by Car Service Division A. R. A. Figures cover only those roads reporting to the Car Service Division. They include equipment received from builders and railroad shops. Figures of installations and retirements alike include also equipment rebuilt to an extent sufficiently so that under the accounting rules it must be retired and entered in the equipment statement as new equipment. The figures as to orders as given in the first column of table are not comparable with figures relating to installations given in succeeding columns.

THE CHESAPEAKE & OHIO has ordered one 200-ton transfer table for use at its shops at Richmond, Va., from the Whiting Corporation.

THE CHICAGO, BURLINGTON & QUINCY has ordered one five-ton three-motor gantry crane for use at Creston, Iowa, from the Milwaukee Electric Crane & Manufacturing Company.

Track Specialties

THE ILLINOIS CENTRAL has ordered 300,000 tie plates from the Sellers Manufacturing Company.

Signaling

THE LOUISVILLE & NASHVILLE has ordered additional sets of equipment for 16 locomotives which will operate in the two-speed continuous automatic train control territory between Corbin and Etowah, Tenn. The Union Switch & Signal Company is furnishing this equipment.

THE PENNSYLVANIA RAILROAD SYSTEM will apply style "S-8" electric units to the present mechanical interlocking machine at "SB" Leetonia, Ohio. The units, with the necessary supporting frame equipment and change of locking, etc., will be furnished by the Union Switch & Signal Company.

THE CHICAGO, MILWAUKEE & ST. PAUL is equipping 57 locomotives for the train control installation on its lines between Bridge Switch and Hastings. This installation is the Union Switch & Signal Company's three-indication continuous automatic stop system and the Union Company is supplying the equipment for these locomotives.

THE WICHITA FALLS, RANGER & FORT WORTH has ordered from the Union Switch & Signal Company materials necessary to install a complete new mechanical interlocking plant at Ranger, Tex. An improved Saxby & Farmer interlocking machine with nine working levers and three spare spaces will be required. These materials will be installed by the railroad company's forces.

THE NORFOLK & WESTERN has ordered 154 ground and 96 bracket signals of the position light type, together with 936 ac. track and line relays and the necessary transformers, reactances, etc., for the installation of block signaling on its Shenandoah division between Shenandoah and Roanoke. These materials are being supplied by the Union Switch & Signal Company, and the field installation will be handled by the railway company's signal construction forces.

THE FLORIDA EAST COAST has contracted with the General Railway Signal Company for the material for installing double-track, alternating current, 3-position, color light automatic block signals between Jacksonville, Fla., and Bunnell (66 miles) and Jupiter and Miami (84 miles). Included in the contract also is a ten-lever table interlocker for South Jacksonville and four automatic substations—one each for Jacksonville, Bunnell, Jupiter and Miami—for feeding the 4,400-volt signal transmission line. Installation will be made by the signal company's forces.

THE WABASH has bought a total of 68 style "R" color light signals for installation at various points on its line as follows: Milan to Britton, 7½ miles of double track; Logansport to Peru, 12 miles single track; Decatur to Bement, 20 miles double and 2 miles single track; Boody to Knights, 6 miles double track; Wabash, Ind., 5 miles single track, and Huntington, Ind., 3½ miles single track. These materials will be furnished by the Union Switch & Signal Company and the field installation will be carried out by the railway company's signal construction forces.

THE READING COMPANY has contracted for all materials and labor for the installation of an alternating current electro-pneumatic interlocking plant at Birdsboro, Pa. The machine will be the Union Company's Model 14, having 30 working levers, 8 of which are for the operation of 43 signals, 21 for 32 switches and derails, one check lever, two spare signal levers, one spare switch lever and ten spare spaces. The high signals will be of the style "R" color light type and the dwarf signals of the N-2 color light type. A-1 switch and lock movements will be used with ac. track circuits extending throughout the plant. The Union Switch & Signal Company is installing this interlocking.

Supply Trade News

Charles E. Pynchon, machinery department manager of Joseph T. Ryerson & Sons, Inc., Chicago, has resigned.

E. E. Silk, district sales manager of the Morgan Engineering Company, Alliance, Ohio, with headquarters in Chicago, has resigned.

The Linde Air Products Company, New York, has located its district sales office at Seattle, in the Railway Exchange building, 619 Second avenue, Seattle, Wash.; O. H. Davenport is district sales manager.

The Chipman Chemical Engineering Company, Inc., has removed its executive and sales offices to its factory buildings at Bound Brook, N. J. A branch office will be maintained at 136 Liberty street, New York City.

The Inland Steel Company will spend \$2,000,000 on additions and improvements to its Indiana Harbor, Ind., plant. Tentative plans have been drawn up providing for the electrification of one entire section of the plant and the addition of 77 coke ovens. In addition, the company is constructing its fourth blast furnace which will be completed by the first of the year.

The Railway Car Manufacturers' Association, an organization of corporate members which has served the car building industry since 1915, terminates its activities and will be succeeded on September 1 by the American Railway Car Institute, an organization of individuals interested in railway car manufacturing and repairing. By the mutual agreement of the organizations concerned the institute succeeds to the assets and liabilities and to certain of the activities of the old association. The office of the institute is at 61 Broadway, New York City. W. F. M. Goss, who was president of the Railway Car Manufacturers' Association, will retire and J. M. Hansen, chairman of the board of the Standard Steel Car Company, has been elected president of the American Railway Car Institute. W. C. Tabbert, who was secretary of the Railway Car Manufacturers' Association, holds the same position with the new Institute. William Freeman Myrick Goss was born at Barnstable, Mass., on October 7, 1859. He graduated from Massachusetts Institute of Technology, Boston. He organized a department of practical mechanics at Purdue University in 1879, where he served as instructor until 1883 of practical mechanics. He then, for the next seven years, was professor of experimental engineering, dean of the schools of engineering and director of engineering in the laboratory. He subsequently was dean of the college of engineering, director of the school of railways engineering and administration, and professor of railway engineering at the University of Illinois until 1917, was also director of engineering for the experimental station from 1909 to 1917 and since the latter year served as president of the Railway Car Manufacturers' Association at New York. He was a member of the jury of awards at the Chicago Exposition in 1893, chairman of the advisory committee of the Pennsylvania Railroad Company charged with testing locomotives at the St. Louis exposition in 1904, and chief engineer of the committee of in-



W. F. M. Goss

vestigation on smoke abatement and electrification of railway terminals in Chicago from 1913 to 1915. He was a member of many technical societies and had served as president of the American Society of Mechanical Engineers, Society for the Promotion of Engineering Education, and the Western Railway Club. He is the author of technical books including *Bench Work in Wood*, 1890;; *Locomotive Sparks*, 1902; *Locomotive Problems*, 1907; *High Steam Pressures in Locomotive Service*, 1907; *Superheated Steam in Locomotive Service*, 1910, and many scientific reports and papers.

The American Cable Company, New York, has appointed **Bruntons Musselburgh**, Scotland, its representative in Scotland, the **Dominion Wire Rope Company**, Montreal, Quebec, in Canada, the **Marion Machine Foundry & Supply Company**, in Marion, Indiana, **J. Shuman Hower**, in Utica, N. Y., the **Contractors Equipment Company**, in Albany, N. Y., and **John C. Louis**, in Baltimore, Md.

E. B. Harkness, secretary of the Illinois Steel Company, also has been appointed secretary of the **Universal Portland Cement Company**, Chicago. **A. W. Carlisle**, treasurer of the Illinois Steel Company, has been appointed treasurer of the Universal Portland Cement Company. **O. N. Lindahl** has been appointed assistant secretary, which position he will occupy in addition to the office of auditor.

E. H. Hagensick, electrical engineer of the Union Pacific for the past six years, has resigned to become associated with the **Pyle-National Company**, Chicago and the **Oliver Electric & Manufacturing Company**, St. Louis, as sales engineer in the northwestern territory. Mr. Hagensick's headquarters are in the Builders' Exchange building, St. Paul, Minn. He was graduated in 1906 as an electrical engineer from the University of Nebraska, and since that time has served as a special apprentice and in various capacities on the Union Pacific.

The **Harnischfeger Sales Corporation** has been organized under the state of Delaware for the purpose of distributing the products of the **Harnischfeger Corporation**. The organization of the new corporation is for the purpose of segregating the selling and manufacturing departments of the business. The personnel of the Harnischfeger Corporation is affected only in that the sales organization has been taken over by the new corporation. The officers of the sales corporation are, **Henry Harnischfeger**, president, **A. G. Henricks**, vice-president and general manager, **W. Harnischfeger**, vice-president, **R. V. Schleinitz**, secretary and treasurer, and **R. Binkowski**, assistant secretary.

American Locomotive Company to Build Whaley Constant Pressure Oil Engine

The American Locomotive Company has acquired the exclusive license for the use of the Whaley constant pressure oil engine on rails in the western hemisphere. An engine of this type has recently been built by the Sun Shipbuilding & Dry Dock Company, Chester, Pa. It departs in one essential respect from all other present internal combustion engines in that a piston valve driven by the valve motion of the type commonly used in steam engineering practice opens the cylinder clearance into communication with a receiver of large capacity relative to the clearance, the valve opening synchronizing with the period of the fuel injection. Through this feature it is claimed that the combustion pressure does not rise above the compression pressure and that an indicator card similar to that of a steam engine is produced. The limiting of the maximum pressure is expected to make possible the production of an engine which will weigh less than 100 lb. per horsepower. The engine just completed is a single-acting, four cylinder, two-cycle machine designed to develop 750 hp.

Trade Publications

GALVANUM PAINT.—A color card and a folder descriptive of Galvanum paint, have been issued by the Goheen Corporation of New Jersey, Newark, N. J. This paint is applied directly to galvanized iron without the aid of an acid wash or primer of any sort, and no weathering of the metal is necessary.

VACUUM RECORDERS.—Vacuum records, which operate on the mercury column principle and employ no moving parts, springs or diaphragms, are covered in Bulletin No. 140 recently issued by the Uehling Instrument Company, Paterson, N. J. Full size reproductions of sections of typical vacuum charts show the legibility of this instrument.

CRANES AND FOUNDRY EQUIPMENT.—A black leather binder made up of individual catalogues containing up-to-date information on cranes, cupolas, ladles, tumbling mills, core oven equipment, trucks, turntables and trolley systems, air hoists, elevators, side-blow steel converter, and brass foundry equipment, has been issued by the Whiting Corporation, Harvey, Ill. Thumb index cards are inserted between each of the catalogues which are of letter size, 8½ in. by 11 in.

MOTOR BUS TERMINALS.—"Facts About the Design and Construction of Motor Bus Terminals" is the title of a four-page folder recently issued by the Austin Company, Cleveland, Ohio. In this folder the design, construction and equipment of motor bus terminals and passenger stations is discussed. Ten questions which should be answered before a single dollar is spent on a bus terminal have been prepared by the construction engineers of the Austin Company and also are contained in the bulletin.

LOCOMOTIVE FEEDWATER HEATERS.—The Superheater Company, New York, has just issued a new catalogue describing and illustrating the theory, construction and application of the Elesco non-contact type of locomotive feedwater heater. The catalogue, which contains 24 8¼-in. by 11-in. pages, is a treatise on steam production and its utilization in locomotives. With the aid of diagrams the increase in efficiency of the locomotive through the application of a feedwater heater is explained and what this amounts to in actual dollars and cents under varying conditions. The latest designs of the device are illustrated and many typical installations shown.

AUTOMATIC CONTROLLERS.—Automatic controllers for temperature, pressure, humidity, liquid level, condensation and other factors which are important to the success of industrial processes, are described in the new catalogue issued by the C. J. Tagliabue Manufacturing Company, Brooklyn, N. Y. The catalogue resembles preceding editions, but is larger and several more instruments are listed. The importance of automatic control in various industries is stressed in a six-page introduction which is an entirely new feature of the catalogue. An interesting discussion of automatic control problems in a number of industries follows, and many actual cases are cited.

ELECTRICAL SUPPLIES.—The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., is distributing its new 1925-27 catalogue of electrical supplies. The publication contains 1,200 pages and is profusely illustrated with 4,500 engravings. All new apparatus designed and manufactured in the past two years, as well as all the previously established types are listed. A very complete subject index in the front of the book is printed on blue paper so that it can be quickly located, and a style number index for checking invoices is located in the back of the book. A classified index under such classifications as central stations, electric railways, industrial plants, mines, etc., gives a complete list of apparatus applicable to each of these groups of industries, and the thumb index enables the user to locate any section of the catalogue with the least inconvenience.

SHOP HANDBOOK ON TOOL STEEL.—Tool steel that is purchased from a mill or a warehouse is not, as a rule, a finished product. It is for this reason that Joseph T. Ryerson & Son, Inc., Chicago, has prepared a book for the tool steel user, as he is the one who must change the tool steel from a semi-finished to a finished product. For the successful carrying out of this operation certain definite information is necessary. This book, which contains 80 pages with illustrations and tables, presents to the purchasing agent, superintendent or the tool maker a technical subject treated in a non-technical way. The book contains chapters on the following subject: Choosing the proper steel for the job; heat treatment of tool steel; heating tool steel; heating equipment; forging tool steel; annealing; quenching; tempering; testing tool steel; heat measurement; grinding. This book should be in the hands of every user of tool steel as it contains valuable information which is generally found only in books of a highly technical nature.

Railway Construction

BALTIMORE & OHIO.—A contract has been awarded to the Vang Construction Company, Cumberland, Md., for grading and bridges for a new main track from Warwick, Ohio, to Sterling (11.5 miles) at an approximate cost of \$70,000. A contract has been awarded to the T. J. Foley Construction Company, Pittsburgh, Pa., for the elimination of grade crossings at Allison Park, Pa., and Elfinwild at an approximate cost of \$39,000.

BOSTON & MAINE.—This company has received bids for the construction of a new office building at East Cambridge, Mass. It was incorrectly reported in the *Railway Age* of August 22 that the Boston & Albany was planning this structure. A contract for the rebuilding of a bridge at Fitchburg, Mass., let to the Boston Bridge Works and another awarded to the T. Stuart & Son Company for foundations for the new office building at East Cambridge were likewise erroneously ascribed to the Boston & Albany.

CHESAPEAKE & OHIO.—The construction of approximately 10 miles of second track between Waverly, Ohio, and Portsmouth has been authorized.

CITY OF PHILADELPHIA.—The Department of Wharves, Docks and Ferries of this city will shortly ask for bids for the construction of a car storage yard of 300 cars' capacity for serving municipal piers Nos. 82 and 84 south.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—A contract has been awarded to the Davis Hunt Construction Company, Dayton, Ohio, for the construction of a freight house and office building at Dayton, to cost approximately \$175,000, as reported in the *Railway Age* of July 4.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—A contract has been awarded to the Walsh Construction Company, Chicago, for the construction of a freight station and office building at East St. Louis, Ill., to replace a building recently destroyed by fire. The new building will be of brick construction, 40 ft. by 200 ft. and three stories in height.

CLEVELAND UNION TERMINAL.—Plans have been prepared for the construction of a two-span structural steel and concrete bridge over the Cuyahoga river, Cleveland, Ohio, to cost \$200,000.

ILLINOIS CENTRAL.—Bids will be called for within 30 days for the construction of a suburban passenger terminal at Randolph street, Chicago, to cost approximately \$2,000,000. Plans for the structure are nearly completed.

LOUISVILLE & NASHVILLE.—A contract has been awarded for the construction of 22 miles of second track between Winchester, Ky., and Richmond.

NEW YORK, NEW HAVEN & HARTFORD.—This company has awarded a contract to the Curtis-Quillen Company for the construction of concrete driveways in its bulk delivery facilities at Providence, R. I., at an approximate cost of \$45,000.

NORTH & SOUTH.—The extension of the present line from Casper, Wyo., to Miles City, Mont., in accordance with the original plans, will be undertaken if the necessary financing can be arranged. It is understood that legal obstructions to the construction of this extension have been removed by the purchase by Peterson, Shirley & Gunther, general contractors in the building of the railway, of all equities, claims, etc., of the Middle States Oil Company and the Reliable Securities Corporation.

PENNSYLVANIA.—A contract for the reconstruction of an under-grade bridge at Lee street, Portage, Pa., has been awarded to the John F. Casey Company, Pittsburgh, Pa.; approximate cost, \$100,000.

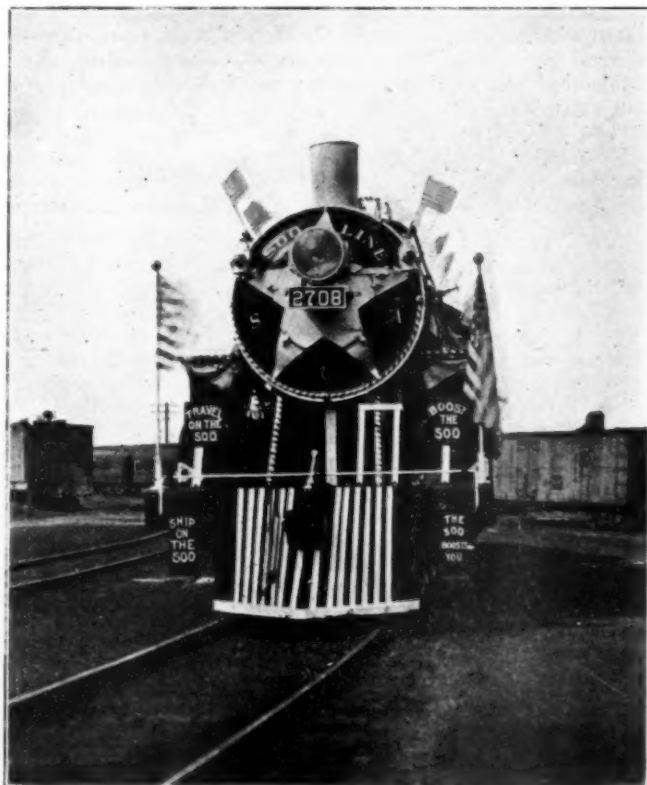
SOUTHERN.—Damage estimated at \$250,000 was suffered by this company when the planing mill, coach shop and freight car repair shop at Knoxville, Tenn., were destroyed by fire on August 22.

WABASH.—A contract has been awarded to Dwight P. Robinson & Co., New York, for the construction of a one-story, 60 ft. by 120 ft. brick and steel machine shop building at Decatur, Ill.

Seaboard Seeks to Build 195 Miles of Line in Florida

Applications have been filed with the Interstate Commerce Commission providing for the extensions of the Seaboard Air Line on the east and west coasts of Florida through its recently chartered subsidiary—the Seaboard-All Florida Railway. The Seaboard's cross-state Florida line will be extended from West Palm Beach to Miami and Florida City on the east coast, and to Fort Myers, Punta Rassa and points in southern Florida on the west coast, a total of approximately 195 miles of new construction on both coasts. In connection with the Fort Myers extension, S. Davies Warfield, president of the Seaboard, has made the following statement:

"The Seaboard Air Line Railway has entered into contract with the American Agricultural Chemical Company for the acquisition of the Charlotte Harbor & Northern Railroad under a three-year lease and for the purchase of the property at the expiration of the lease, subject to the approval of the Interstate Commerce Commission. The Charlotte Harbor & Northern Railroad owns approximately 133 miles of railroad, including industrial and other tracks, running from Bradley Junction, a point on the Seaboard, to Boca Grande with extensive terminals on the Gulf of Mexico. This will give the Seaboard the only protected deep water Gulf port terminal south of Tampa. The C. H. & N. Railroad serves phosphate rock plants of the American Agricultural Chemical Company and other mining companies in this section of Florida, and together with the new mileage to be constructed will form the main line connection of the Seaboard to Fort Myers, Punta Rassa and points in southern Florida to a connection with the Naples, Seaboard & Gulf Railroad, to be constructed by John S. Jones, which the Seaboard has contracted to take over three years after date of construction. The Seaboard Air Line Railway through the Charlotte Harbor & Northern and the new construction in connection therewith will form the short line from Jacksonville and northern points to Fort Myers and contiguous territory."



Soo Locomotive in Holiday Dress on Occasion of Annual Outing of Fond du Lac and Stevens Point Shop Employees

Railway Financial News

ALABAMA & VICKSBURG.—Tentative Valuation.—The Interstate Commerce Commission has served a tentative valuation report as of June 30, 1918, in which the final value of the property owned and used is placed at \$7,690,900.

CHICAGO, MILWAUKEE & ST. PAUL.—Subsidiary Foreclosed.—The Chicago, Milwaukee & Puget Sound, a subsidiary of the Chicago, Milwaukee & St. Paul, was ordered foreclosed and the receivership consolidated with that of the parent company, as a result of a suit filed on behalf of the United States Trust Company as trustee, and Edward W. Sheldon, who claimed that the company had defaulted interest payments on its first mortgage bonds. Judge Wilkerson of the United States District Court at Chicago, who heard the suit, named as receivers for the Puget Sound road, Edward J. Brundage, M. W. Potter, and H. F. Byram, the receivers of the St. Paul.

Interest Payments Due.—The receivers of the St. Paul asked the court for permission to pay the interest on a note for \$25,000,000, held in the treasury of the United States, and also asked permission to default in payment of interest on a \$20,000,000 note held by the director general of railroads. The receivers claim that the interest on the note held by the director general may as well be defaulted because the note is secured by bonds which have already been defaulted. Counsel for the receivers argued that if the court ordered the payment of interest on the \$20,000,000 note, the government would then be in the position of a preferred creditor. The receivers' motion was contested by a representative of the director general who contended that if the interest on the \$20,000,000 note was defaulted the government would be obliged to sell the securities of \$32,000,000 par value for the present market price, which would be about \$15,000,000. The interest payment which the receivers wish to make to the treasury of the United States on September 1 amounts to approximately \$750,000.

The court approved the proposals of the receivers in both instances.

CHICAGO, ROCK ISLAND & PACIFIC.—Equipment Trust.—The Interstate Commerce Commission has approved the issue of \$5,400,000 equipment trust certificates, Series N, to be sold to Speyer & Co. at 96.89 per cent of par, making the annual cost to the railroad about 5 per cent. The certificates mature in equal annual installments from August 1, 1926, to August 1, 1940. The equipment includes 20 locomotives, 1,600 freight cars, 7 passenger train cars, 2 Mack motor cars, a wrecking crane, and 4 ditchers, having a total cost of \$4,729,536, and also 1,000 rebuilt refrigerator cars to be procured from the Rock Island Improvement Company, these cars having a total value of \$2,565,000, making the total cost of all the equipment \$7,294,536.

GREAT NORTHERN.—Stock.—The Interstate Commerce Commission has authorized the issuance of \$300,000 preferred stock to be sold to assist in the construction of a branch line in Daniels and Valley Counties, Mont., recently authorized by the commission.

ST. LOUIS-SAN FRANCISCO.—Jonesboro, Lake City & Eastern Lease.—Stockholders of the Jonesboro, Lake City & Eastern Railroad at a meeting at Jonesboro, Ark., on August 24, unanimously approved a proposal for the leasing of the road to the Frisco System for a period of 99 years.

Dividends Declared

Boston & Providence.—2½ per cent, quarterly, payable October 1 to holders of record September 19.
Philadelphia, Germantown & Norristown.—\$1.50, quarterly, payable September 4 to holders of record August 21.

Trend of Railway Stock and Bond Prices

	Aug. 25	Last Week	Last Year
Average price of 20 representative railway stocks	87.51	87.29	70.71
Average price of 20 representative railway bonds	91.35	91.03	87.50

Railway Officers

Executive

R. E. Davies, who has been appointed assistant to the president of the Minneapolis, St. Paul & Sault Ste. Marie, was born at Cambria, Wis., and entered railway service in 1905 as a clerk on the Minneapolis, St. Paul & Sault Ste. Marie. He was later employed in clerical capacities in the offices of the division superintendent, the general superintendent, and the general manager, and was promoted to chief clerk to the general manager in February, 1913. Mr. Davies was promoted to trainmaster of the Minnesota division in June, 1917. During federal control he was appointed chief clerk to the federal manager and continued as chief clerk to the executive vice-president after the termination of federal control. He was appointed chief clerk to the president in June, 1922, and continued in that capacity until his recent promotion to assistant to the president.

A. E. Wallace, who has been elected vice-president and general manager of the Minneapolis, St. Paul & Sault Ste. Marie, with headquarters at Minneapolis, Minn., was born at Nashua,



A. E. Wallace

N. H., on March 2, 1879, and was educated at Harvard University, from which he was graduated with the degree of Bachelor of Arts in 1902. He entered railway service in November of that year as a clerk on the Great Northern at Larimore, N. Dak., where he remained until January, 1904, when he was employed on the Chicago, Rock Island & Pacific as a yard clerk. He was later successively promoted to time-keeper and to chief clerk until January, 1907, when he was appointed special inspector on the

Chicago, Burlington & Quincy. Mr. Wallace later held the positions of assistant extra-gang foreman, foreman, assistant roadmaster, and trainmaster. In February, 1911, he was appointed special inspector on the staff of the second vice-president and was promoted to assistant superintendent in September, 1911. He was appointed division superintendent on the Chicago, Rock Island & Pacific in July, 1912, where he remained until January, 1918, when he was appointed general superintendent on the Erie, with headquarters at Chicago. Mr. Wallace was transferred to Youngstown, Ohio, as assistant general superintendent in June, 1918, and was promoted to manager of the Chicago region in March, 1920. He was appointed general manager of the Minneapolis, St. Paul & Sault Ste. Marie in June, 1922, and held that position until his recent promotion to vice-president and general manager.

Operating

Dwight S. Brigham, assistant to the president of the Boston & Maine, has been appointed assistant general manager.

E. C. Clark has been appointed trainmaster of the Atlantic Coast Line, with headquarters at Charleston, S. C., succeeding E. B. Rush, promoted.

H. R. Laughlin has been appointed assistant superintendent of the Big Sandy division of the Norfolk & Western, pursuant to the taking over of the Sandy Valley & Elkhorn Railway

by the Norfolk & Western and its amalgamation into the N. & W.'s Big Sandy division.

The report in the *Railway Age* of August 22, that **Earl Sandberg**, trainmaster of the Springfield division of the Wabash, had been promoted to acting superintendent of the Peru division, succeeding **W. H. Eckard**, who is on leave of absence on account of ill health, was erroneous. Such an appointment has not been made.

A. G. Smart, general superintendent of the Wyoming district of the Chicago, Burlington & Quincy, with headquarters at Alliance, Neb., has retired. He was born on April 16, 1869, at New York, and entered railway service in 1885 as a telegraph operator on the Kansas City, St. Joseph & Council Bluffs, now a part of the Chicago, Burlington & Quincy. He later successively held the positions of station agent, train dispatcher, chief dispatcher, trainmaster and division superintendent until 1917, when he was promoted to general superintendent of the Wyoming district. Mr. Smart remained in that position until his recent retirement.

Samuel E. Miller, who has been appointed general superintendent of transportation of the Boston & Maine, was born on November 25, 1881, at North Acton, Mass. He entered railway service on February 27, 1899, as a relief agent on the Boston & Maine, and from March 4, 1899, to September 10, 1903, he was ticket agent and telegraph operator on the same road. In September, 1903, he became telegraph operator in the train dispatcher's office, and held this position until March, 1907, when he became clerk in the general superintendent's office. From April, 1912, until May, 1917, he was inspector of transportation, and from May, 1917, to June, 1918, was acting superintendent of transportation. He became superintendent of transportation at this time and held that position until 1923, when he was appointed superintendent of the Southern division which position he held at the time of his recent promotion to general superintendent of transportation.



Samuel E. Miller

Traffic

H. J. Schwieter, general development agent of the Illinois Central, with headquarters at Chicago, has resigned to engage in other business.

F. H. Bremer has been appointed general agent of the Canadian National, with headquarters at Cincinnati, Ohio, succeeding **W. K. Evans**, who has been assigned to other duties.

H. J. Dentzman, general agent, freight department, of the Chicago & Eastern Illinois, with headquarters at St. Louis, Mo., has been promoted to assistant general freight agent.

F. B. Townsend, who has resigned as chief traffic officer of the Minneapolis & St. Louis, has been appointed director of traffic of the Minneapolis Traffic Association, Minneapolis, Minn.

B. F. Moffatt, general freight agent of the Minneapolis & St. Louis, with headquarters at Minneapolis, Minn., has been promoted to assistant freight traffic manager, with the same headquarters, a newly created position. **R. N. Golden**, assistant general freight agent, with headquarters at Minneapolis, has been promoted to general freight agent in place of Mr. Moffatt.

W. E. Nichols has been appointed general freight agent of the Danville & Western, the Carolina & Northwestern, the High Point, Randleman, Asheboro & Southern, the Blue Ridge, and the Yadkin Railroad, with headquarters at Atlanta, Ga., to succeed **R. L. Butt**, who has resigned to enter the service of another company.

Engineering, Maintenance of Way and Signaling

C. W. Breed, office engineer of the Chicago, Burlington & Quincy, with headquarters at Chicago, has been promoted to engineer of standards, with the same headquarters, a newly created position.

Arthur O. Ridgway, chief engineer of the Denver & Rio Grande Western, with headquarters at Denver, Colo., has been appointed also chief engineer of the Denver Union Terminal Company.

A. W. White has been appointed assistant division engineer of the Big Sandy division of the Norfolk & Western, this division having been increased in size by the amalgamation with it of the Sandy Valley & Elkhorn Railway.

E. E. Adams, district engineer of the Central district of the Great Northern, with headquarters at Great Falls, Mont., has been transferred to the Western district, with headquarters at Spokane, Wash. **T. G. Hastie**, district engineer of the Western district, has been appointed assistant district engineer of the same district, with headquarters at Seattle, Wash. **Peter Hervin** has been appointed assistant district engineer of the Western district, with headquarters at Everett, Wash. These transfers are made pursuant to the consolidation of the Western and Central districts, insofar as the engineering department is concerned, with headquarters at Spokane, Wash.

The positions of the three district engineers on the Chicago, Milwaukee & St. Paul, lines west, have been abolished, and in their place seven division engineer's positions have been created. As a result of this change, **Edward Murray**, district engineer at Miles City, Mont., has been appointed division engineer of the Musselshell division, with the same headquarters. **F. M. Sloane**, district engineer at Butte, Mont., has been appointed division engineer of the Idaho division, with headquarters at Spokane, Wash. **J. F. Pinson**, district engineer at Seattle, Wash., has been appointed division engineer of the Coast division, with headquarters at Tacoma, Wash. **R. H. Smith**, assistant engineer at Seattle, has been promoted to division engineer of the Trans-Missouri division, with headquarters at Mobridge, S. Dak. **W. E. Ring**, assistant engineer at Miles City, Mont., has been promoted to division engineer of the Northern Montana division, with headquarters at Lewiston, Mont. **John Guinotte**, assistant engineer at Butte, Mont., has been promoted to division engineer of the Rocky Mountain and Missoula divisions, with headquarters at Deer Lodge, Mont. **C. A. W. Musson**, assistant engineer at Seattle, Wash., has been promoted to division engineer of the Olympic and Bellingham divisions, with the same headquarters.

Obituary

Alexander Douglas, formerly vice-president of the St. Louis-San Francisco, and later chief accounting officer under the receivership and consulting auditor following the receivership, who retired from active service in October, 1919, died at St. Louis, Mo., on August 20, after a long illness.

THE COMMISSION has suspended from August 15 until December 13, 1925, the operation of certain schedules as published in tariffs of various individual lines and agents **J. J. Cottrell**, **J. H. Glenn** and **F. L. Speiden**. The suspended schedules propose to revise the rates on lumber and other forest products between points in Carolina, Southeastern and Mississippi Valley territories and points in Virginia and North Carolina. This revision results generally in increased rates.